DECEMBER 1938

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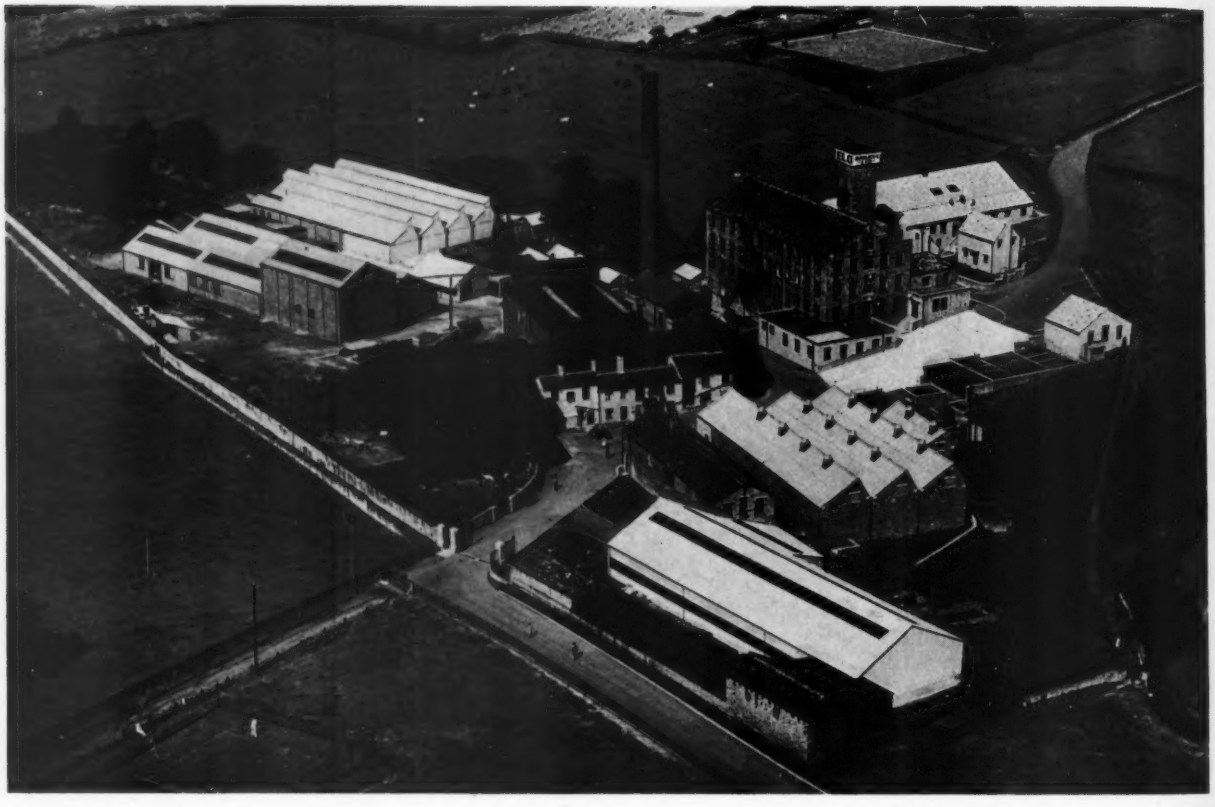
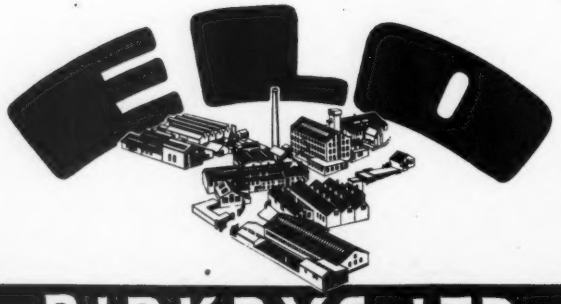
Plastics

DEALING WITH THE MANUFACTURE USES AND POTENTIALITIES OF PLASTIC MATERIALS



Aerial photograph *August, 1938*

MOULDINGS
POWDERS
RESIN AND
38/10 VARNISH



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the perfect pair.

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. . . . . phrases which represent our feelings—for the increase in our output of Plastic mouldings during the current year is due to the confidence placed in us by you. May we therefore wish you the very best for Christmas and the New Year, and ask you to remember that whatever the moulding—large or small—we can make it and are always ready to help you with technical advice and special designs.

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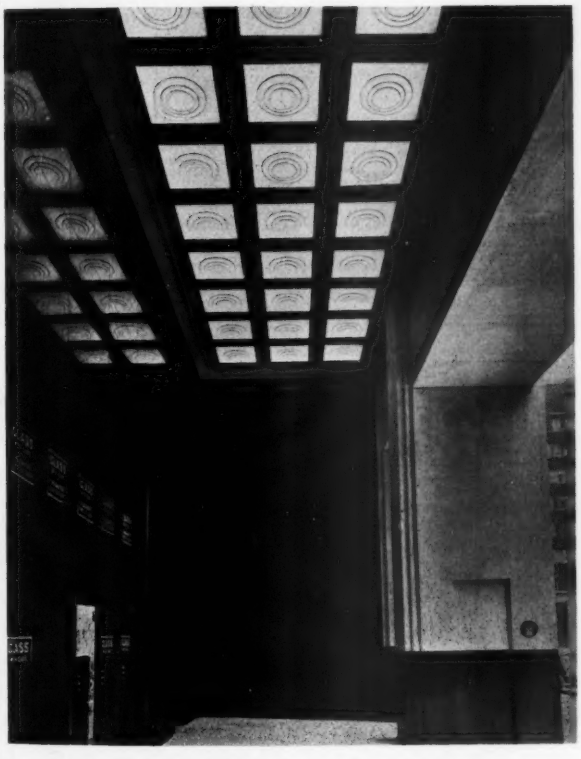
of
SYNTHETIC RESINS
and
ACETATE SHEETINGS



Roof lighting at the new building in Berkeley Square (constructed by Sir Robert McAlpine & Sons (London), Ltd.), moulded and machined by Plastilume Products, Ltd., from Perspex, to the design of Gordon Jeeves, Esq., and Hector O. Hamilton, Esq.

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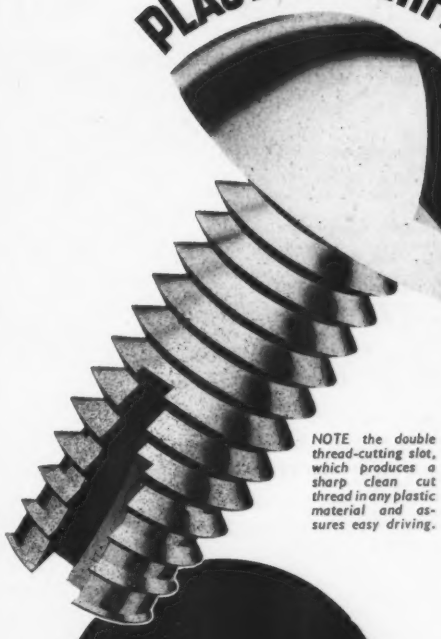

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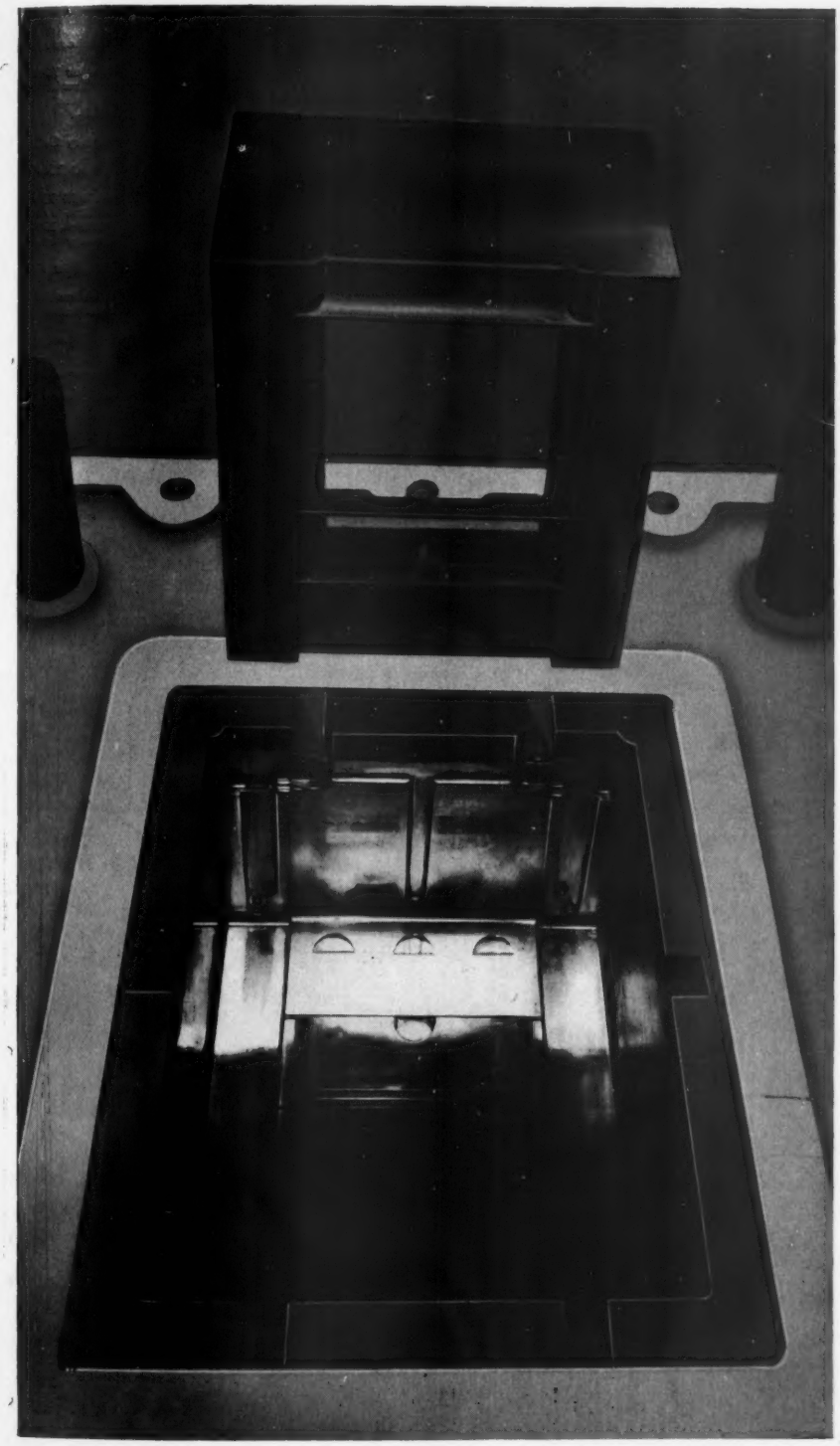
Continued on page vi.

NITRALLOY STEEL

FOR

PLASTIC MOULDING



NITRALLOY MOULD and G.E.C. WIRELESS CABINET. *Photo by courtesy of G.E.C. Witton Moulded Insulation Works, Birmingham.*

NITRALLOY G.K.
has proved itself the ideal metal for plastic moulding because it—

1. Gives the mechanical properties required.
2. Is machinable without difficulty into the most intricate design.
3. Takes the high-class finish which is so essential.
4. Responds to the one process of surface hardening which has no adverse effect upon dimension or surface, i.e. the nitriding process.
5. Has a surface hardness after nitriding which is admirably suited to plastic moulds.

Try nitralloy steel for your next mould.

THOS. FIRTH & JOHN BROWN LTD. SHEFFIELD

DIRECTORY OF THE INDUSTRY

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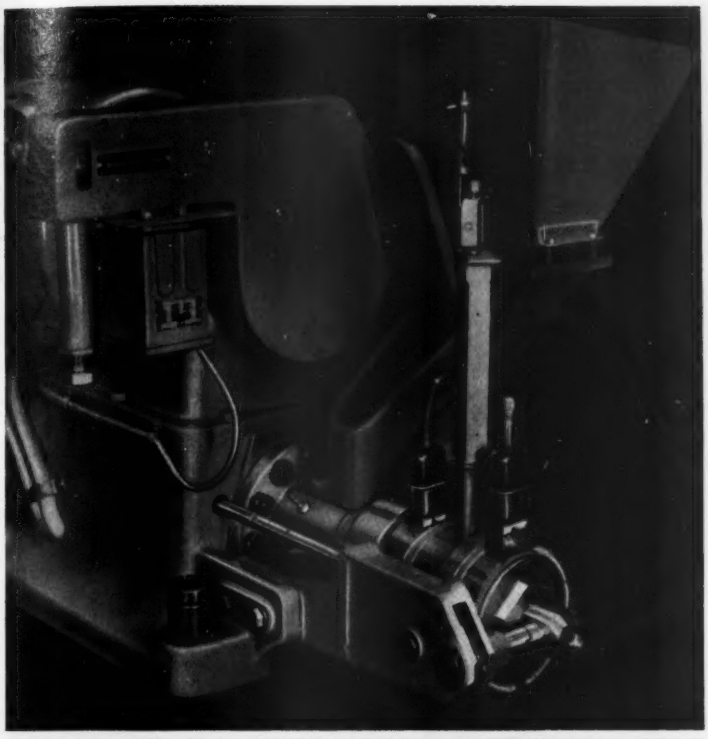

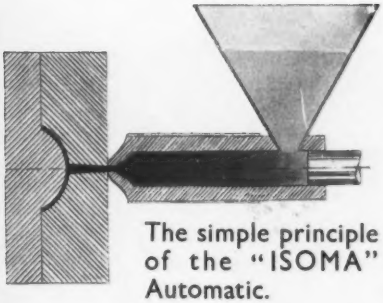

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The Automatic Dosing Device Precludes Waste.

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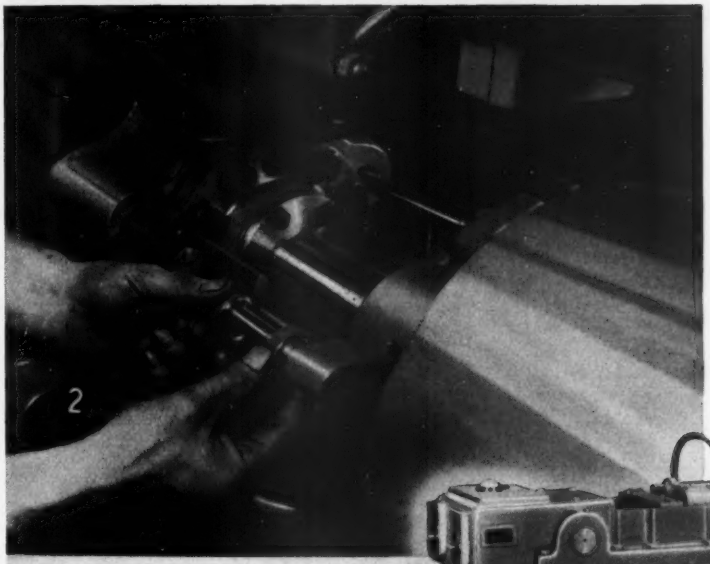

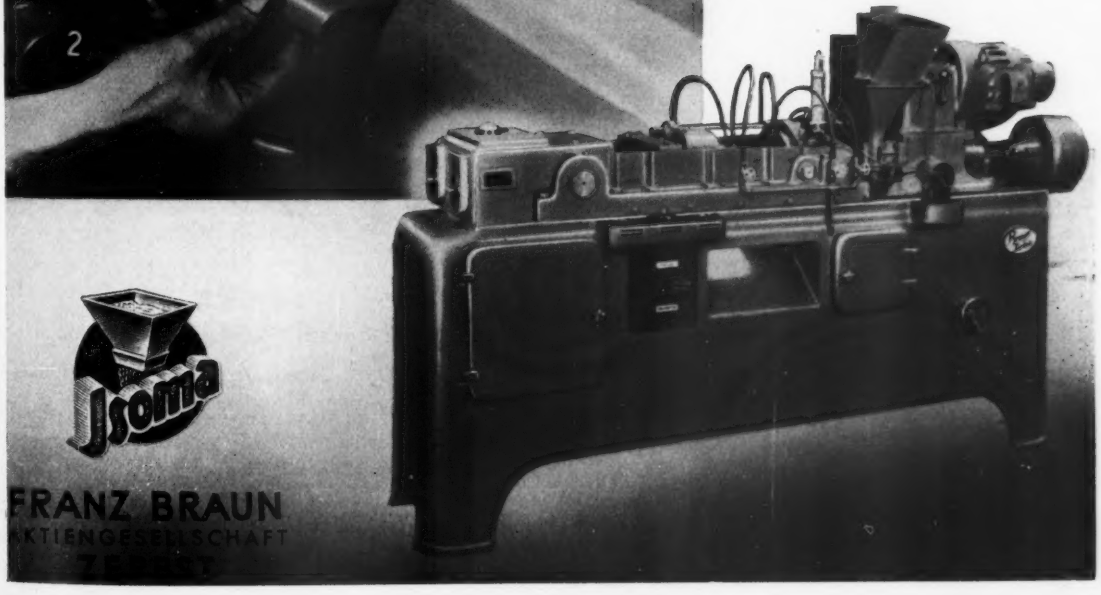

This is what you might call a straight-forward case of useful — or use empty! The case is moulded of black or ivory Beetle. It carries a flacon of "Autumn Crocus" perfume and when that is finished the plastic container enters upon a new lease of life as a trinket or cigarette box to take a round ten cigarettes. Moulded after-use containers like this are showing that a thing of (practical) beauty *can* be a joy for ever. And they certainly help to sell the product!

The mouldings are made for Lambelle Ltd., by **STREETLY MANUFACTURING CO LTD**

DIVISION OF **BRITISH INDUSTRIAL PLASTICS LTD**

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Plastics

Dealing with the Manufacture, Uses and Potentialities of Plastic Materials.

Vol. II. DECEMBER, 1938 No. 19

Index to Advertisers.

Ashdowns, Ltd. .. .. .. —
Ashworth & Meredith, Ltd. .. .. ii.
Bakelite, Ltd. .. .. x.
Barber & Colman, Ltd. .. .. .. iii.
Birkbys, Ltd. .. .. Inside Front Cover
Bridge, David, & Co., Ltd. .. .. —
British Celanese, Ltd. .. .. .. —
British Cellophane, Ltd. .. .. —
British Industrial Plastics, Ltd. .. viii.
British Rototherm Co., Ltd. .. .. —
British Xylonite Co., Ltd. .. .. —
Byson Appliance Co., Ltd. .. .. xiv.
Catalin, Ltd. .. .. —
Crystalate Mouldings .. .. .. ii.
Danks of Netherton, Ltd. .. .. —
Dowding & Doll, Ltd... .. .. vii.
Ebonestos Industries, Ltd. .. .. —
Ellison Insulations, Ltd. .. .. —
Erinoid, Ltd. .. Inside Back Cover
Firth, Thos., & John Brown, Ltd. .. v.
Fraser, Andrew.. .. .. Back Cover
Gardner, Wm. & Sons (Gloucester), Ltd. xvi
Hamburger, M... .. .. .. xiv.
H. & D., Ltd. .. .. —
Herbert, Alfred, Ltd. .. .. .. —
Higgs, G. N. .. .. xvi.
I.C.I. (Plastics), Ltd. .. .. .. xi.
Lorival Manufacturing Co. (1921), Ltd. xiii.
Manesty Machines, Ltd. .. .. xvi.
May & Baker, Ltd. .. .. .. —
M.C.L. and Repetition, Ltd... .. xiv.
Mollart Engineering Co., Ltd. .. —
Moulded Products, Ltd .. .. xii.
N. B. Mouldings, Ltd... .. .. —
Phipps Plastic Products, Ltd. .. —
Pitman, Sir Isaac, & Sons, Ltd. .. xiv.
Plastilume Products, Ltd. .. .. iii.
Pulsometer Engineering Co., Ltd. .. —
Rootes Mouldings, Ltd. .. .. xii.
Steele & Cowlishaw .. .. .. xiv.
Synthite, Ltd. .. .. iii.
United Glass Bottle Mfrs., Ltd. .. i.
Young & Wolfe .. .. xvi.

Announcements.

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TEMPLE PRESS LIMITED
Proprietors, Printers and Publishers of "The Motor," "The Light Car," "The Commercial Motor," "Motor Cycling," "Cycling," "The Motor Ship," "The Motor Boat and Yachting," "The Oil Engine," "The Aeroplane," "Light Metals," and "Chain & Multiple Store."
5-17, Rosebery Avenue, London, E.C.1

Other notices appear on last page.

CONTENTS

	PAGE
Editorial	383
Warmer Outlook Thanks to Philco Heater ..	385
New Bars for Old	386
General Release	388
Ideas, by The Editor	390
Stars and Stripes	392
House of Harmony	394
Portfolio of Christmas Gifts	395
Introducing Plastics to the Theatrical Designer	399
Rubber in the News..	401
Unlimited Ideas for Limited Companies ..	402
A Study in Light and Shade..	405
Just to Remind You	406
Plastics for Modern Window Displays ..	407

Production:

Notes and Comments..	408
Selection of Various Plastics	410
Inquiries and Answers	412
News About Injection Moulding Machines..	414
Injection Moulding at British Xylonite Works	415
Trade and Personal Notes	416
New Materials—New Plant—New Methods	417
Patents	418

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The illustrations show attractive furniture produced by Messrs. E. Gomme Limited of High Wycombe. Above and left (below) show a dressing-table with the top in BAKELITE Decorative Veneer and a wardrobe with bindings of coloured BAKELITE Veneer in contrast with pastel-coloured woodwork. The kitchen dresser strikes a new high level in kitchen furniture; the back is black BAKELITE Veneer.

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Vol. II. No. 19 DECEMBER, 1938

Plastics

Dealing with the Manufacture, Uses and Potentialities of Plastic Materials

Proprietors - - TEMPLE PRESS LIMITED
Managing Director - ROLAND E. DANGERFIELD

Editor - - M. D. CURWEN, B.Sc., A.I.C.
Offices - 5-17, Rosebery Avenue, London, E.C.1

ON PUTTING UP NEW WORKS

WE recently had the pleasure of attending the annual luncheon of the British Plastics Federation, at which Lord Portal was the chief guest and speaker. He addressed the gathering, which consisted of nearly all the large producers of plastics—raw materials and finished goods—on a subject of which he has deep and personal knowledge, namely, the position and the rehabilitation of the distressed areas.

It was a moving story he had to tell and nobody present, we feel sure, was not deeply stirred by what has happened in those once-prosperous districts in South Wales, Tyneside and certain parts of Scotland, whose coal mining, iron foundry and shipbuilding industries were the wonder and envy of the whole world. To-day the unemployment in these districts is of a magnitude the more fortunate central and southern districts of England cannot comprehend. Old experienced men with the engineering skill that made the country famous are out of work. Some of the youth approaching the twenties have never known a day's work in their lives, because there is no work for them to do.

There could have been nobody present at the luncheon who did not feel sympathy for those unfortunates and who did not feel within him that "something must be done." Merely feeling that "something must be done" is, of course, not good enough. Lord Portal told us what had already been done and what it is hoped will be done. There exists the Special Areas Reconstruction Association, Ltd., which has already done great work. One of its most important efforts has been to introduce new industries into the distressed areas, happily with some success. This method of replacing or, rather, adding to, the more or less sole industry of a district with a variety of industries is most promising and fully deserving of success. As we pointed out in our May, 1938, issue, Treforest, in South Wales, once a very distressed area depending solely on the coal-mining industry, now possesses in its trading estate 26 new factories manufacturing, amongst other goods, moulded toys, toilet and fancy goods, chrome leather, watch straps, batteries, refractory materials and pistons. We cannot but express our thankfulness to bodies like the Special Areas Association and Commissioners, and to certain other individuals, who consider it their job to sympathize with these districts in very practical ways. Of these individuals, Lord Portal mentioned Lord Nuffield and told us some stories regarding the latter's activities which do not seem to have reached the public's ear. Few of us, for example, had heard that this man had given the money to reopen a colliery that had been closed for years.

What did Lord Portal want of the plastics industry? He did not say so specifically, but he obviously hoped that it would be possible to introduce plastics manufacture, either the raw material or finished goods, into the distressed areas. We feel sure that many present at the luncheon took his words as a direct invitation.

The problem is not a simple one. The plastics industry in almost all its branches is a very young one, albeit growing, and compared with most other industries is really a small industry, in spite of the fact that the number of units turned out by its presses annually is astronomically large. There is also the fact that, because of its very youth, the plastics industry has not yet what might be called "settled down," a state of affairs which besets every new achievement. This process of "settling down" is gradually taking place, the more progressive works based on sound principles are expanding and a reasonable co-operation exists between most of the different works. This will increase in time and with it will come a greater interchange of knowledge, scientific and economic, to increase the safety of the industry.

In spite of any drawbacks that do exist, however, we look forward at some future date to the erection of moulding works in, say, Tyneside or South Wales. The expansion of the industry will be great, for more than ever are plastics entering into industries that never before used them. Industrialists, as well as the public, are becoming conscious of the impact of plastics on life.

Since the Special Areas Reconstruction Association offers loans at very advantageous terms, there is an additional inducement to open up moulding factories in these areas. Indeed, individuals and companies have already made preliminary inquiries. We offer these our best wishes and trust they possess the neces-

sary facilities for making their projects successful. It has been intimated by experts that the minimum required to open a factory is about £20,000. However this may be, what is also required is a thorough understanding of what is pre-eminently an engineering project and perhaps even more important, the ability to conceive new ideas. New factories should not be created merely in order to take business away from existing concerns by the very simple industry-wrecking method of price cutting.

Moulded Car Bodies

AS we have already pointed out, there have been rumours that the plastic moulded motorcar body is either a fact or on the point of becoming one. These rumours originated from Germany and followed the announcement that the Government of that country was exceptionally eager to produce a machine the price of which was well within the reach of the working class. Speculation followed as to what plastic material could be used for producing large parts. The greatest hope would seem to be with the use of laminated products which can now be produced in curved forms or by the direct moulding of resin impregnated sheets as exemplified by "Peton," a note on which we included in our November issue.

The motor trade in this country do not look upon the moulded motor body as one that is likely to appear in the near future. Moreover, one representative of a very large motor-building firm informed us that he had seen one of the proposed "people's" cars in Germany and that it was not a moulded job at all. He also informed us that he did not think much of it compared with the low-priced British car. This was confirmed by ourselves at this year's motor show. The German car which cost well over £150 looked by no means of the same quality as the British car of the same price, that is, judging by outside appearance only. There was little to commend it from this point of view and the plastic moulded facia-board was a dull affair.

This, however, was not the moulded body motorcar we are hoping to see, and that there is some hope of this we gather from a patent recently taken out by the Auto-Union Aktien Gesellschaft. By this, "main component parts of vehicle bodies, such as sides, rear parts and roofs, are made of laminated artificial resin materials, being moulded directly by means of heat and high pressure, the parts then being assembled to give a vehicle body. The parts may contain reinforced ribs or metal inserts and flanges, the latter for securing parts together by means of metal or resin stirrups or webs."

Moulded Coffins

Readers may remember our recent editorial on the possibility of manufacturing coffins from some plastic material. We also indicated that a proposal for such manufacture was afoot in Lancashire. It now appears quite definite that manufacture will begin there on a large scale during the latter part of January. We hope to publish full details in due course. The company concerned is the Ultralite Casket Co., Ltd., who are patentees of the "moulded leak-proof interment casket." This would indicate that the process is in fact a moulding job and that the coffin will not be produced from laminated sheet.

Moulded Shrapnel Helmets

Readers will also remember our agitation for the production of some type of helmet, similar to the "shrapnel" or "tin" helmet as supplied to the soldiers, which might be issued to the public or at least to air-raid wardens, policemen and others who would be especially exposed to risks during air-raids. We have now the information that one well-known plastic moulding concern has made some samples which are now being tested at one of the Government testing stations for suitability.

Safety in Mines

A new and interesting application of plastics has arisen through an explosion in a mine. The short case in which detonators are carried has usually been of metal, but a recent fatal explosion caused by a short circuit from the metal case has encouraged users to look to plastics for the manufacture of these cases. A moulding firm in the Midlands is now carrying out this work.

The Plastic Ski

Germany is now making skis from a plastic material probably of the laminated, impregnated resin type. It is claimed that a great advantage afforded by this new material is that snow does not cling to the ski nor does it require waxing. Its great water-resisting properties prevent distortion and it is further claimed that it is not only lighter but also stronger and tougher than the materials normally used for the manufacture, namely hickory and ash.

Gas Mask Containers

Now that it has been clearly stated that the responsibility of keeping gas masks in good condition and ready for use rests with the public, a great deal more interest is being taken in their preservation. The Metal Box Co., Ltd., 28, Kingsway, London, W.C.2, has now produced a special Worcester Ware Clamptite Canister, which is ideal for this purpose. It has a tinplate body and a sturdy moulded lid of reinforced phenol-formaldehyde resin. When it is closed the edge of the body is embedded in a rubber ring inside the cap and securely held in place by a polished snap fastener. The new container retails at the very reasonable price of 1s. 6d.

New Plastic Material

In the latest bulletin issued by the General Lighting Information Service, reference is made to a new American plastic known as "Flamenol." The specification given states that it is a synthetic insulating compound, similar to rubber but not containing rubber and completely incombustible. It can be compounded, filled, calendered and extruded much in the same way as rubber and is available in a number of colours. One of the chief advantages of the new material is that it does not age or deteriorate when used for insulating cable.

Peton in the Textile Industry

According to information just received from a correspondent in Manchester, the new laminated material made by Universal Insulators, Ltd., is likely to prove useful in several of the big mills for reducing noise. Gearwheels made of Peton have been tried out very successfully on large weaving machines for fancy fabrics, and also on various kinds of looms, and the material is also now being used in the manufacture of picking sticks, bobbins, etc. Noise has always been a great menace to both health and efficiency in the mills, and although it is generally agreed that operatives can get used to the infernal din, an increase in efficiency would inevitably result from a diminution of noise.

Moulded by Thomas De La Rue and Co., Ltd., for the Philco Radio and Television Corp. of Great Britain, Ltd., the new Philco fan heater is certainly a practical and very acceptable solution of the domestic heating problems.

WARMER OUTLOOK THANKS TO PHILCO FAN HEATER

Adaptation of existing tools previously used for moulding the famous Philco People's Set made possible this moulded fan heater at short notice and with the minimum of die costs.

THERE is apparently quite a healthy demand for this type of heater, which, unlike the ordinary electric fire, provides all-round warmth quickly, not merely in the immediate vicinity of the source of heat, but throughout the room, and in addition can be used to circulate cool air during the hot summer days. The Philco Corp. realized this fact earlier in this year and at once commenced to consider ways and means of making a popular model. At the outset, however, the management realized that, owing to the heavy demands on the engineering industry by armament manufacturers, the delay in making the necessary tools would be excessively long, and with a new idea like the fan heater it does no good to be last in the field. It was a happy expedient to try to adapt the tools used for moulding the Philco People's Set by altering the front of the cabinet by the provision of metal louvres where the speaker fret and tuning dial were originally placed. Although it must be admitted that the heater bears too strong a resemblance to a radio set to be anywhere near perfect, it does represent a very clever and certainly not unsuccessful attempt to overcome those first difficulties, which at the time seem almost unsurmountable.

The consumption of the heater is 1,500 watts (equal to 1½ units per hr.), and it is claimed to be equal to a convection-type fire of 2,000 watts. An air screw moulded of phenol formaldehyde resin for noiseless operation, draws the cold air in through the back of the cabinet, through the heater elements, and out of the front.

The heater is primarily designed as a domestic unit, and it should prove very acceptable as, being portable, it can be used in all sorts of rooms. For instance, the manufacturers point out that if it is switched on in the dining-room for half an hour or so before eating, the room will be nice and warm when the family is ready to sit down to a meal. In the nursery the Philco is especially useful. It is so designed and protected that children cannot possibly come to harm through fiddling with it. There are no sharp edges and the wire gauze prevents any accidental contact with hot or moving parts. The healthful distribution of warm air is most desirable in the nursery and certainly contributes towards a reduction in colds during the dreary winter months.

In the summer the fan heater is also designed to play its part. When used without the heating elements it is a very practical and economical way of keeping temperature down without creating harmful draughts. It is advisable to put the heater near an open window, so that the air can be drawn in through the back and cooled by the fan before being distributed evenly throughout the room.

The Philco fan heater, which sells at £3 19s. 6d., is obtainable in two colours, black and mottled brown, and is meeting with a very favourable response, not only from Philco dealers but the trade in general. There seems little doubt that the heater will be a popular choice for Christmas, and certainly it would be difficult to think of a more acceptable one for a large number of homes.

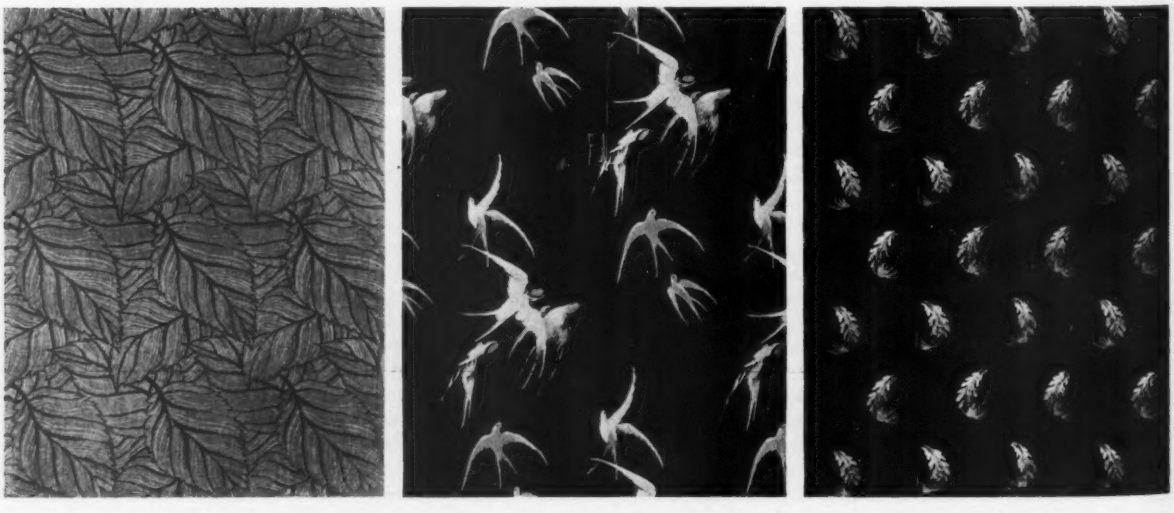
This smart-looking cocktail bar shows to full advantage the excellent decorative effects now obtainable by the use of Bakelite veneers for bar counter, walls and doors. The table in the immediate foreground is also provided with a Bakelite top.

NEW BARS FOR OLD

THE monotonous sameness of the staid, sombre public houses of the so-called "good old days" has now passed into merciful oblivion and to-day's licensed premises must be colourful, smart and distinctively different; in fact, to encourage business it is essential that they should reflect the character and personality of the new age.

The experience of plastics in the modern public house has, during its relatively short history, been a particularly happy one, and in the opinion of architects specializing in the construction and renovation of licensed houses, a more generous use is likely to be made of these materials in the near future. Brewers, who have a reputation for hard bargaining and a canny business sense, are very favourably inclined towards plastics because they combine distinctive beauty with the ability to resist wear and hard usage. The high polish or lovely dull satin finish of laminated panelling and table tops does not crack or chip, is practically dent-proof, and can be easily cleaned without damage with ordinary soap and water. Moreover, table tops made of the special blister-proof variety is not in any way damaged by smouldering cigarettes or hot objects likely to be placed on their surfaces and, in addition, they are quite immune from any injurious effects due to alcoholic liquors, etc.

On a price basis plastics can now compete on very satisfactory terms with materials suitable for the same



Three examples of real fabric panelling made by Warerite, Ltd., which reveal the beauty of the natural material made completely permanent and washable by impregnating with suitable synthetic resins.

purposes, and as regards fixing, the new veneers are readily adaptable to either remodelling or new installations. They can be furnished in thin, pliable sheets for applying direct to smooth existing surfaces or in veneers bonded to standard types of bases, and whether applied to bars, wall panelling, or table tops they permit the creation of novel, distinctive, decorative effects hitherto impractical with ordinary finishing materials.

Of particular interest at the moment is the future of the new decorative veneers. This type of laminated plastic is a great step forward, and although at present it is only in its early stages, the process is full of promise. The method of manufacture is very similar to the production of ordinary laminated material. The sheet of paper or linen is painted with the desired pattern in colours and is then impregnated with special amino resins dissolved in a suitable solvent. The latter is afterwards cured under heat and pressure and bonded to a stiff backing. Bakelite, Ltd., have pioneered this fascinating new branch of veneers and already a great deal of interest has been created in the licensing trade.

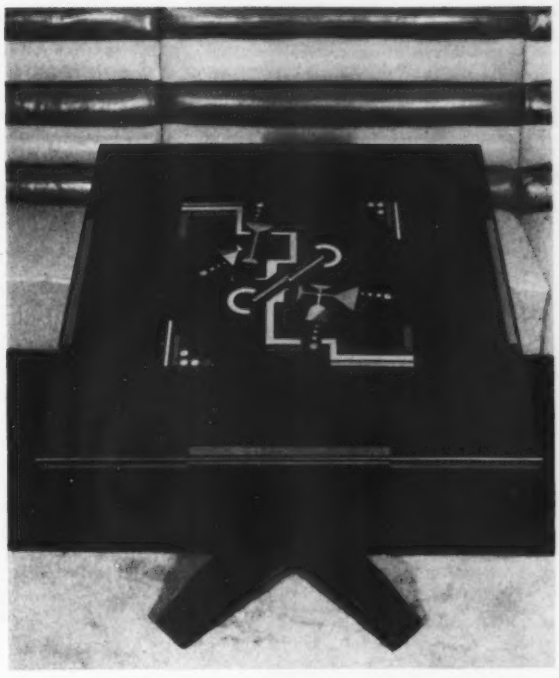
Warerite, Ltd., Ware, Herts, are now producing laminated panelling made with real tapestry which retains all the rich colouring and lovely texture of the original. Photographs cannot do full justice to this new material, but at least they convey something of its charm and originality. This firm is fortunate in possessing the services of Mr. Deutsch, who is considered one of the greatest experts on laminated veneers. Warerite, Ltd., have now received orders for the decoration of a new liner and new railway carriages. The veneers are available in the form of thin, pliable sheets or attached to suitable plywood and other wood bases with special adhesives. In the latter form they are likely to prove

Gleaming Micarta contributes to the beauty and utility of this bar in the Manhattan room of the Hotel New Yorker, U.S.A.

of very considerable interest to architects responsible for the modernization of inns or the construction of modern licensed premises on new estates.

The use of metal inlays for decorating the surface of laminated sheets is very popular in America where inlaid Micarta table tops, bars and wall panelling are now well known. The adaptability of the inlaid process for plastic veneer enables the designer to give full rein to his imagination and skill in creating a motif that is distinctive, appealing and original.

Apart from laminated veneers, there are other important applications for plastics in the modern public



Coloured metallic inlays add to the attractiveness of the Micarta table tops in the Manhattan room.

house. For instance, moulded Bakelite trays are noiseless, hardwearing, strong and easy to keep spotlessly clean, and for these reasons they are being extensively used in new premises. Then, again, there are all kinds of occasional tables moulded of phenol formaldehyde resins as well as smokers' requisites which are practically everlasting in both wear and smart, fresh appearance. All these various contributions of plastics not only help to improve and modernize a public house, but reduce the necessity for a good deal of maintenance work. Thus it might well be claimed that plastics are real assets to the brewery companies and ones which they will do well to increase by their more liberal use in the future.

Koroseal-coated Paper

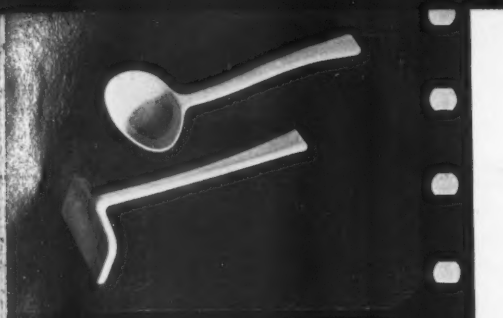
Kraft paper coated with a thin layer of Koroseal, which is an American rubber-like plastic, is now being used for packaging purposes, and is especially useful for protecting the exposed surfaces of machinery in ocean transit. The paper is said to be impervious to deteriorating fluids and gases, resistant to oils, air, water and light. Packaging experts in America who have had an opportunity to examine the new material are enthusiastic, because they realize the immense potential applications of the treated paper.

New Laminated Material

A recent patent, B.P. 488,911, describes the manufacture of a laminated material made up of wood veneers and webs of fibrous material highly impregnated with synthetic resins and subjected to heavy pressure. It is stated that the degree of impregnation of the various webs may vary, the outermost layer preferably containing most resin. Sheets, blocks and dishes can be made with the new material, which appears to have many interesting possibilities for both decorative and domestic applications.

"General Release"—I

New and Interesting Plastic Goods

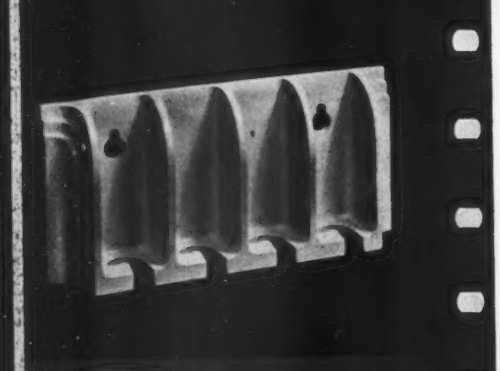


THE moulded baby's spoon and pusher are very popular additions to the British Xylonite Co., Ltd., wide range of nursery articles, and are not only exceptionally light and thus easy for a baby to hold, but colourful and exceptionally strong. They are moulded of amino resin powder.

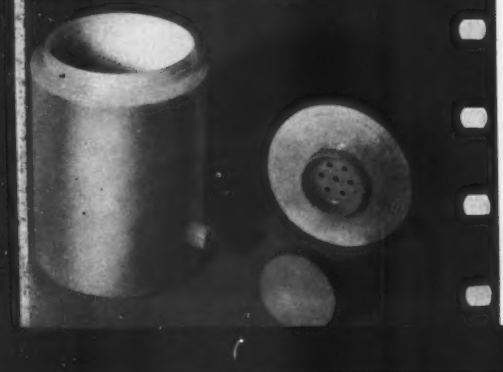
ACCURACY and attractive appearance are happily combined in this, one of the latest models of the famous Temco range made by T. M. C. Harwell, Ltd. The case is made of transparent cast resin and the actual size of the clock is 6⅝ ins. wide and 5 ins. high. It is fitted with the well-known "Bijou" movement and sells at 35s. 6d.

ALTHOUGH completely devoid of skill and that impassive countenance so necessary for success in poker, we realize what a popular game it is, and have, therefore, no hesitation in predicting a good demand for these new sets of chips made of Catalin by the Axford Manufacturing Co., Ltd.

THE British Xylonite Co., Ltd., have for many years now specialized in nursery goods, and this little toilet outfit, made of Xylonite, is proving particularly popular, especially as a gift to new arrivals.



THE plastic toothbrush holder illustrated here was designed by O. C. Hawkes, Ltd., and moulded for that company by H. E. Ashdown (Birmingham), Ltd. The main point about this holder is that each brush is housed in a separate compartment, which is, of course, a hygienically valuable feature.



IF ingenuity of design and manufacture could assure the success of an item, then certainly this talcum container should sell like the proverbial hot cake. It is designed for the nursery and is equipped with a press-button, which, on pressing, produces a rather intriguing squeak. The container, apart from the lid, is made up of two distinct mouldings, the outer one being powder blue in colour and the inner case of ivory. Colts Patent Fire Arms Manufacturing Co. are responsible for the manufacture of the example shown.

"General Release"—II

New and Interesting Plastic Goods

HERE are a few examples of Plexiglass tableware. They are very simply designed and yet in every way practical. Although not often seen in this country, these pieces are popular in Germany and Austria and may be seen in the better-known stores in these countries.

IN our October issue we described the work now being done by British Artid Plastics, Ltd., at their new factory in the Slough Trading Estate. The plaque now illustrated is yet another example of the wealth of design and delicacy of colouring obtainable by their process.

THEY say that Autobridge is very popular in the United States and, as will be observed, the American moulder has certainly done his best to make it popular. The outfit is almost entirely made of plastics and so designed that it fulfils every possible requirement, particularly ready accessibility and ease of manipulation.

THE game of draughts is still very popular and vies with dominoes in making a wide appeal to both young and old. In view of this, we confidently expect this neat and compact traveller's set, made of Erinoid, to prove a most acceptable gift this year. Axford Manufacturing Co., Ltd., of Brunel Road, East Acton, London, W.3, are the manufacturers.

THIS interesting display, which well illustrates a practical and, indeed, decorative method of mounting solid Bakelite wall panels, created a great deal of interest when it was shown on the stand of Bakelite, Ltd., at the Builders' Exhibition, held at Olympia last September.

THIS moulded eye-bath is a product of Colts Patent Fire Arms Manufacturing Co. of America and conforms to all the practical requirements of the medical and optical professions. It is made of translucent amino-resin moulding powder, and is, of course, not so fragile as glass and far less liable to cut or scratch.

Ashdowns, Ltd., inform us that they hold stocks of these eye-baths and are distributors for Great Britain.

Ideas—

By the EDITOR

Identification Discs.

A reader has written urging us to put forward to the proper authorities the question of providing the public with identification discs such as soldiers carried during the last war in case of casualty. Especially is it necessary for them to be worn by children who may be evacuated to a variety of districts throughout the country. He insists that they could readily be made from phenol formaldehyde moulding powder. Some system is very necessary, I think, but not as simple discs, for the name or number cannot be punched on as simply as they were on the fibre one used in the last war. And an identification more complicated than a disc would not prove very acceptable. On the other hand, cellulose acetate or laminated material could be easily stamped.

Space Filler

I can scarcely put forward this new lamp as a new idea, but it does show that the Hungarians are not afraid of design. I have lifted this picture from our friendly *Müanyagipar*, the Hungarian journal that deals with plastics. Unfortunately, the typescript is just beyond me, and I can only say that it is made from Futurit, which is an amino-formaldehyde

resin. The complicated form of the lamp stand indicates that it is probably made from more than one moulding.

Is it Animal or Vegetable?

Although the original reason for producing transparent food covers was mainly to keep out flies, which do not worry us overmuch during the present month, the advantage of general cleanliness is so manifest that these covers are becoming of wide and general use. Their transparency, too, is important, for with one glance you can tell whether you will have a kipper or a pork sausage for your breakfast. On the

other hand, of course, there is always the objection that on sundry mornings, especially the morning after Christmas, the presence of so very visible a kipper would not send us into ecstasies. On the whole, however, the covers are very welcome, and those illustrated are obviously attractive and provided with strong handles. They have been sent to us by Allan Manufacturing Co., Ltd., who have fabricated them from cellulose acetate.

Indian Manufactures

Here, again, I do not present the object shown in the photograph below as a staggeringly new idea. Mr. Dingley, of British Industrial Plastics, Ltd., has sent it to me to show that it is not only the so-called great industrial nations that are producing moulded goods. The object is a Plantain Leaf Cup, so called probably because the design on the outside takes the shape of a plantain leaf. It has been moulded of pink-

coloured Beetle for the Mysore Palace by the Government Electric Factory of Mysore, Bangalore City. I shall certainly follow Indian manufactures with close attention in future.

Book Covers

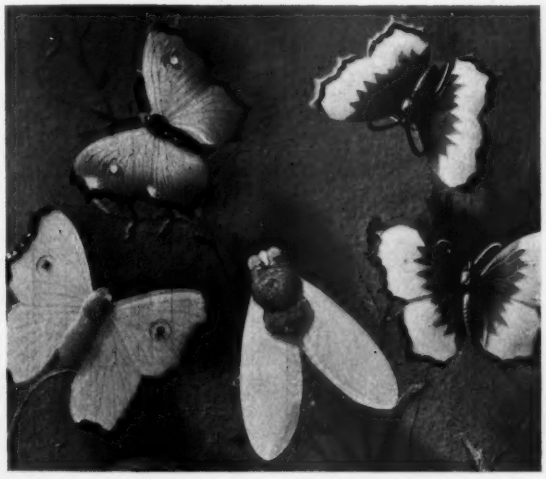
A reader writes:—"I have just seen some samples of vinyl resins in sheet form, ranging in hardness from a soft rubberlike material to hard and tough sheet which appears almost unscratchable. I remember some time ago you gave an example of a ledger the sides of which were made in Bakelite. Is not this new material ideal for making the entire covers of books? They would last much longer than the cloth-covered types and would not be attacked by fungus or insects in the tropics."

This is, of course, an excellent suggestion, and I, too, feel sure than vinyl resins are suitable for the purpose. In the case of cheap books, however, even of the 7s. 6d. range, I feel that publishers will have to have a change of heart before they would agree to the increased cost entailed. It is hoped that for the technical book, sometimes priced as high as 25s. and over, they will relent and provide a cover that will last relatively long periods. The reader of such books deserves, and should get, a better cover than is usually provided. As for books used in the tropics, we have already described what happens when they are loaded and pasted with glue, a delicate morsel for any bug.

German Injection Moulding

THE beautiful examples of injection-moulded dress ornaments shown in the accompanying photographs are typical of the results obtained from the modern machine and by individual artistry. They have been sent to us by Eckert and Ziegler, G.m.b.H., of Koln-Braunsfeld, whose well-known injection moulding machines were employed for the manufacture. The objects, each of which has a pin attached to the back, have been produced by firms in the Gablonz area (formerly Czechoslovakia) from mono-coloured Trolitul, the polystyrol resin, and subsequently coloured by hand in various colours.

The "butterflies" are especially noteworthy for their excellent workmanship and delicate colouring.



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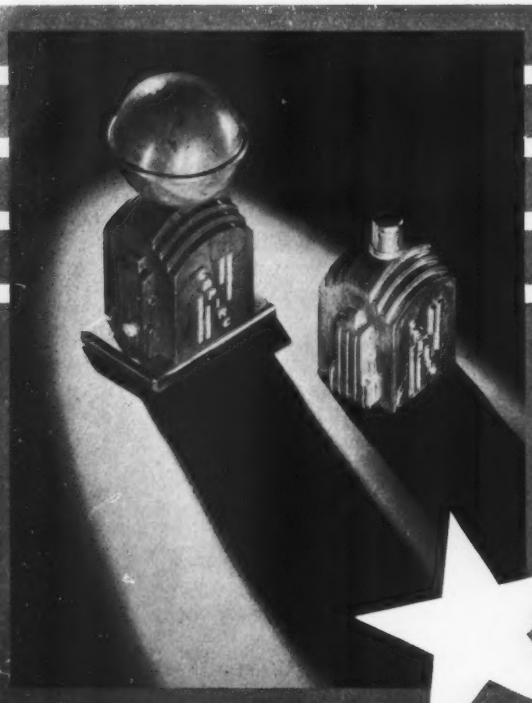
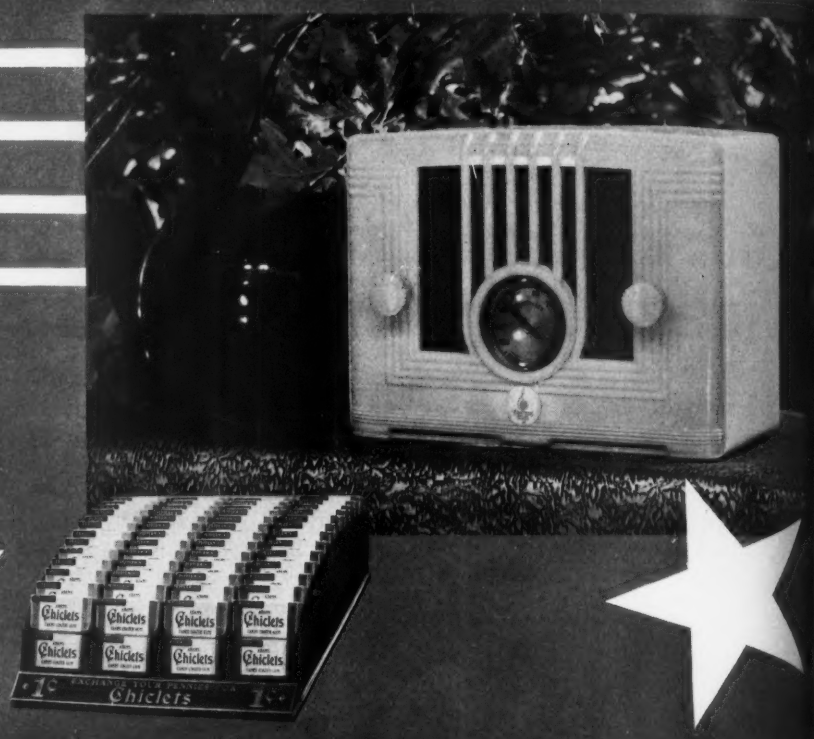
MORE STARS AND STRIPES



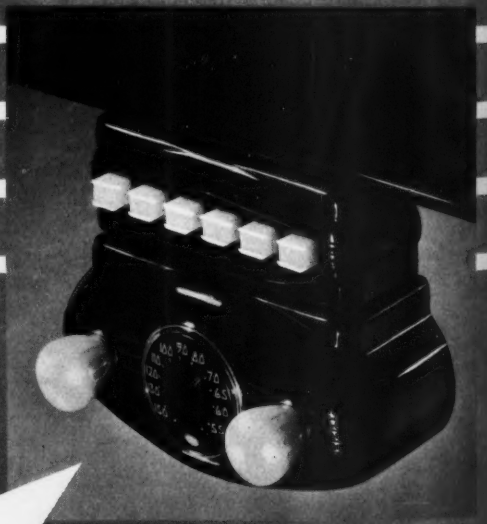
"Empire" hand stamps are given an injection-moulded coating of Tenite over a base which is die cast in metal, the plastic acting as a finish which matches the knob. The latter is hollow and is moulded in two parts and cemented together at the "equator."



Candy-coated chewing gum bearing the name "Chiclets" finds a wide sale in the United States. It is marketed successfully from counter displays such as that here shown. The moulding is done in Bakelite by Northern Industrial Chemical Company.

Many table models of American wireless receivers, such as the Emerson radio here illustrated, are moulded from plastics, ivory amino resins (Beetle in this instance) being a favoured material because this colour looks well in almost any setting.

Sobenite, Inc., moulds these reel seats for fishing rods, using the injection process and cellulose acetate (Tenite) plastic in mottled colours which are attractive and permanent. The parts are light in weight, strong and resistant to water.



Many American cars are fitted to-day with radio receivers provided with push-button tuning devices. The control unit for such a set is here shown mounted below the instrument panel. It is moulded in two parts by the injection process, as are the six tuning buttons and two knobs. Tenite is used in moulding all the parts named.

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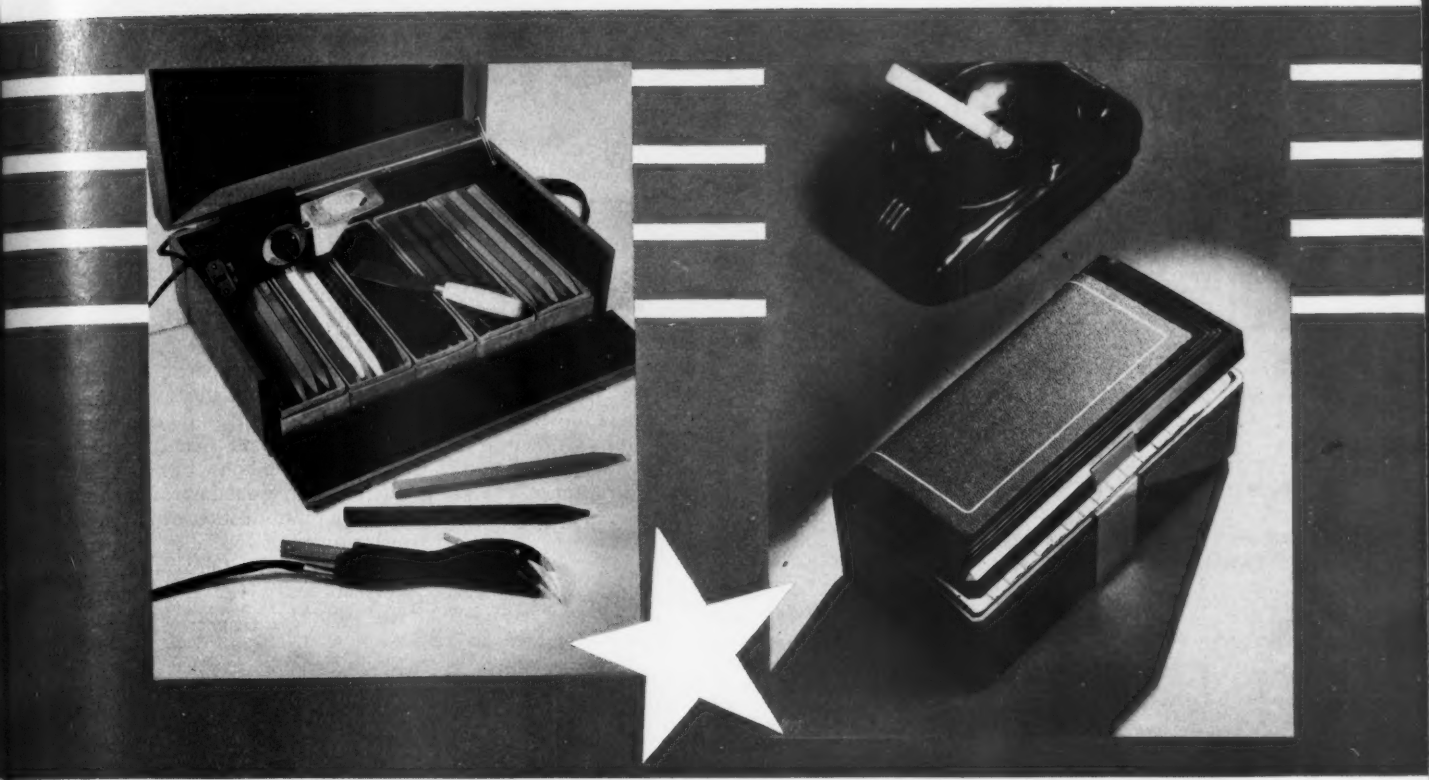
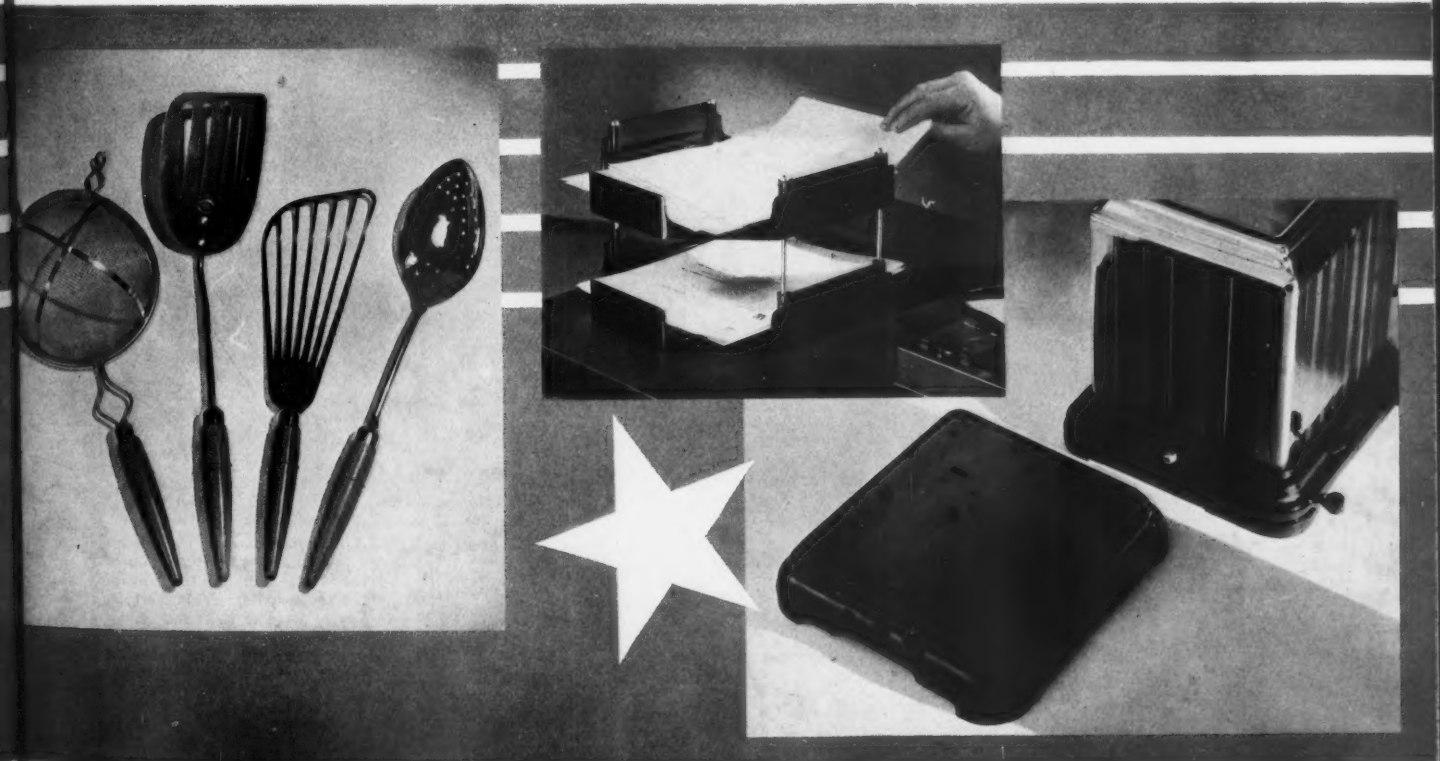


Sealing wax in this elaborate set is softened by an electric heating element in the metal nose of the applying tool shown in the foreground. The body of the tool is moulded from heat-resistant Bakelite, which is also a poor conductor of heat, little of which flows into the handle.

The Gorham Company, producer of beryllium-copper moulds, moulded this handsome cigarette box for Benson and Hedges. It has a black fabric leather-like inlay in the top panel and a gold-plated metal insert in front. The box is done in black phenolic (Durez) plastic.



More than 20 different pieces of kitchen ware are included in the Edward Katzinger Company's "Crest" line. Handles are moulded in brilliant green and red Durez, colours which are most popular in American kitchens. The handles are resistant to foods and soap.

Shaw-Walker Company, well-known American producer of office furnishings, has introduced recently these well-designed trays for letters which are rendered more accessible by the open corners. Mouldings are produced in Bakelite by Auburn Button Works.

Heat-resistant Durez, a General Plastics Corp. product, is employed in moulding the base for this "Tri-Matic" toaster, an electrical appliance manufactured by Samson-United Corporation, Rochester, N.Y. Chromium-plated metal parts of the toaster are well set off by the black base.

THE HOUSE OF HARMONY

A PLEA for the use of better quality materials in the decorative scheme of the low-priced house was given practical shape in the House of Harmony display at the recently held Woman's Fair, Olympia. Two identical houses each costing approximately £600 were erected, one of which was decorated in the style normally adopted by builders while the other was finished with modern decorative materials. The walls and ceiling of the dining recess in the House of Harmony were covered with Bakelite decorative panels, the well-known plastic wall-surfacing material.

From floor to dado height buff-coloured panels were used, while a delicate shade of pink was adopted for the remainder of the wall surface and the ceiling. A pleasing effect was obtained at the junctions of the various panels, these being covered with polished aluminium strips. The work was carried out to the design of Mr. F. R. Yerbury, Hon. A.R.I.B.A.

A novel and effective method of publicity consisting of a recorded voice drew the attention of visitors to the various features of interest in the House of Harmony. The obliging voice pointed out the wide colour range, durability and cleanliness of Bakelite materials.

The principal and, indeed, a very convincing argument advanced by the advocates of increased expenditure on interior decoration is that it is more satisfactory to have a relatively small house well and durably decorated than a slightly larger house with a less attractive interior finish.

The exhibit at the Woman's Fair demonstrated that plastics are definitely being considered and used in the decoration of modern houses, and judging from the interest shown by visitors we anticipate a considerable number of inquiries from prospective house owners and also those who are anxious to carry out improvements in older types of houses by the introduction of modern materials. A point which proved of special interest to women was the fact that by the use of the new plastic panelling it was possible to make the home more colourful and yet at the same time ensure that the panelling was easy to keep clean, always fresh looking and, of course, perfectly hygienic.

A dining recess in the House of Harmony, which was one of the most popular features of the recently held Woman's Fair, Olympia. The walls and ceiling of this charming little room were surfaced with Bakelite veneers.]

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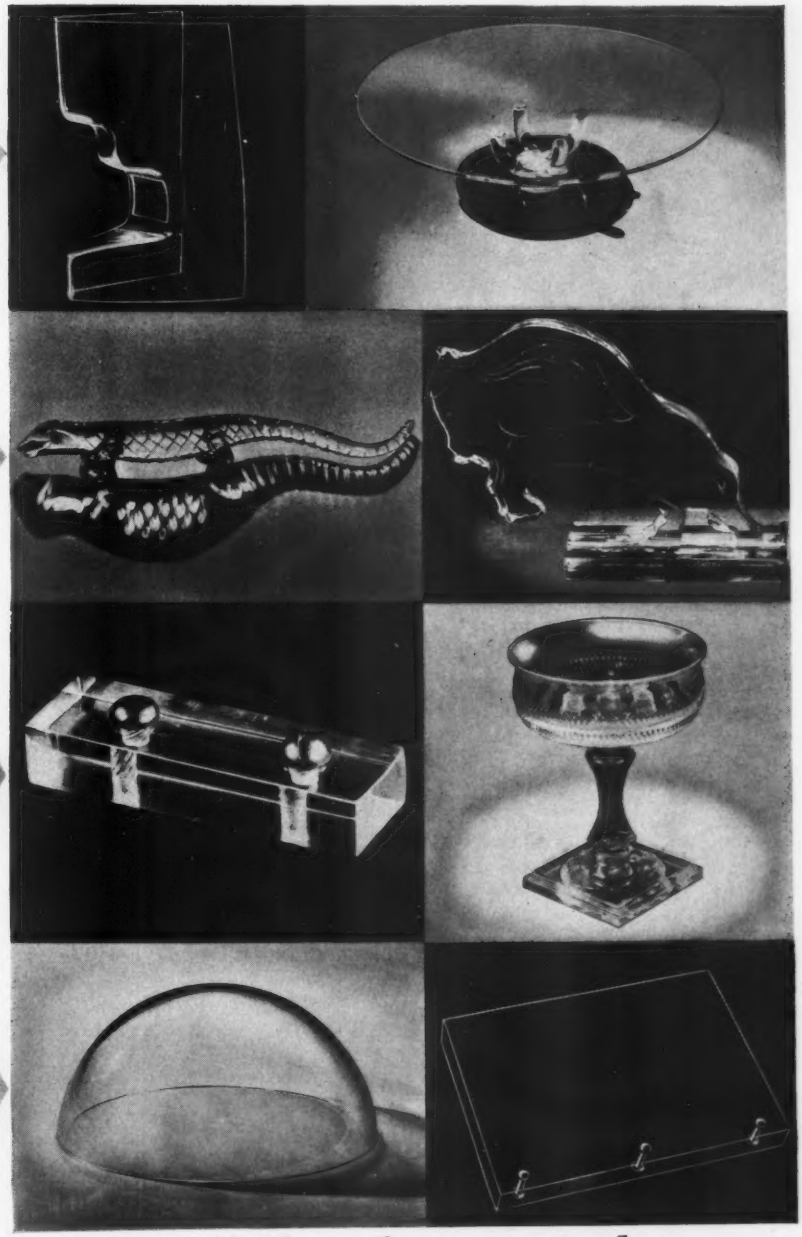

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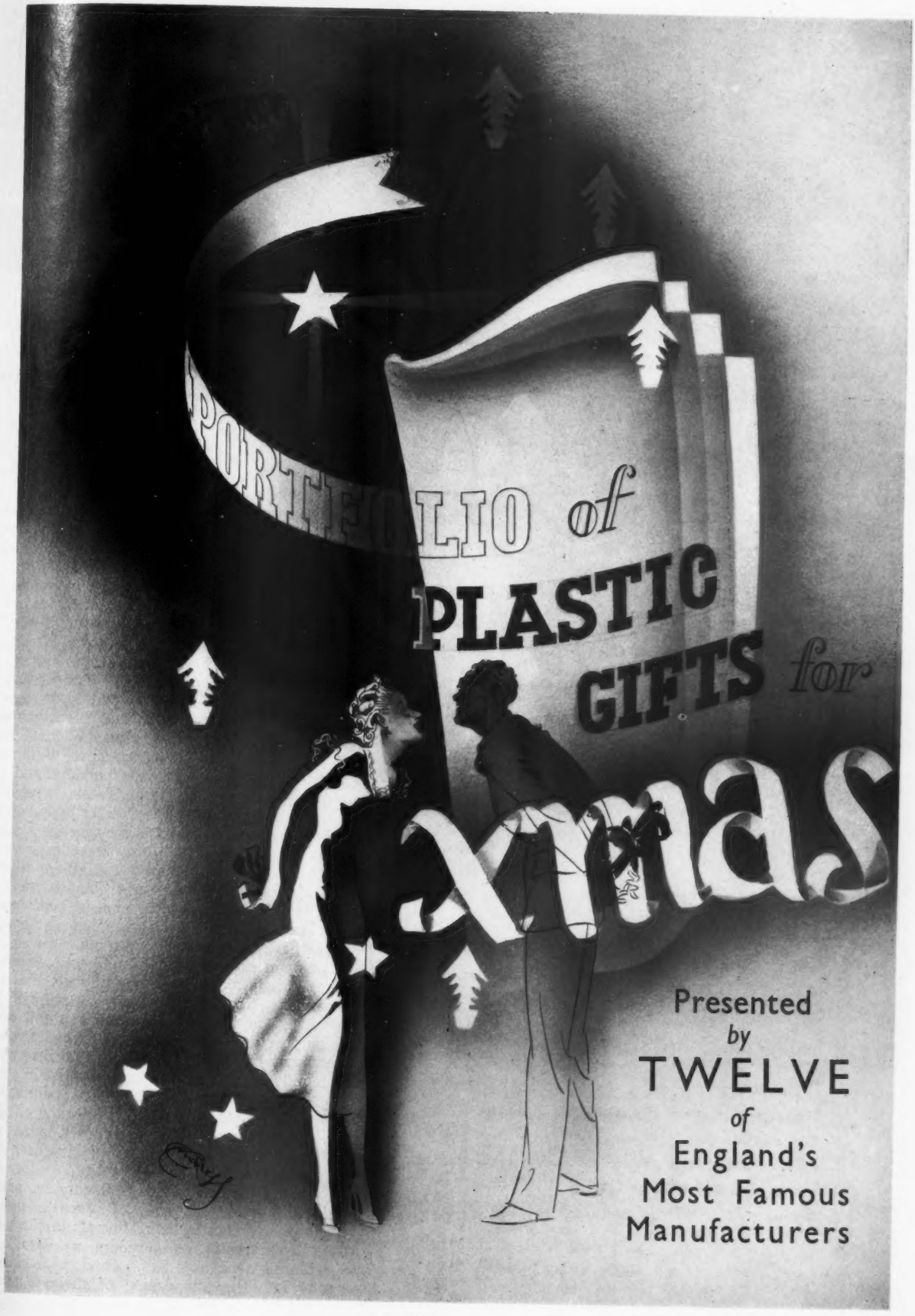
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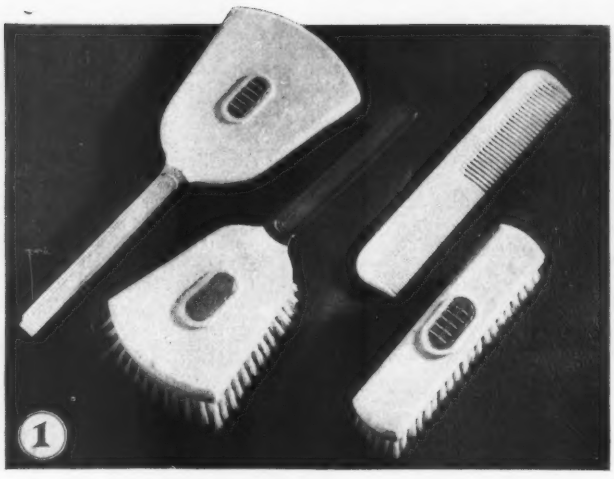


1.—Marlborough toilet ware by British Xylonite, Ltd.

2.—Ekco moulded table.

3.—No-Fume smokeless ash receiver moulded by Prestware, Ltd.

4.—Jane Seymour Beauty Budget set.

5.—Autumn Crocus perfume container moulded by British Industrial Plastics, Ltd.

Christmas

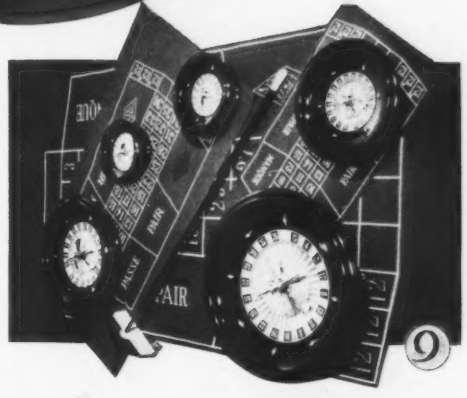
THERE is magic in the air; the magic of Christmas that makes crusty old gentlemen suddenly remember their obligations as grandfathers and prim old maids their duty as aunts. The young people also undergo a strange metamorphosis at this time and assume a rather touching affection and respect towards their elders. Instead of giving opinions with a dictatorial air they even ask for advice with flattering humility and are very ready with their laughter or condolences as the occasion merits.

The postman no longer slams the garden gate with a resounding crash, but closes it so quietly that you think he has not been. The newspaper boy ceases to serenade you with his shrill whistle when he delivers the morning paper and the usually surly road sweeper touches his hat and wishes you "Good Morning."

The newspapers catch something of the Christmas spirit a few days before the holidays and there is a marked tendency for Father Christmas to jostle Major Crisis off the front page and for news of wars and revolutions to be set next to the sporting news. Instead of grim photographs of goose-stepping troops there are pictures of monstrous fat geese at Smithfield market and pantomimes in place of balloon barrages.

Yes! what a great game of make-believe we all play at Christmas, and although it deludes no one, there are few it fails to please. Crowded into a few hectic days is such a surfeit of happiness and good comradeship that it makes gluttons of us all. Although almost everyone complains about "this tiresome business of buying presents," it is really great fun and full of surprises. This year the shops look more intriguing and inviting than ever before and the range of goods certainly more tempting than in previous years. Plastic gifts are well to the front in both variety and attractiveness and it does not matter very much whether the gift is for your wife or someone else's, sister, brother, father, or mother, plastics can, in one form or another, satisfy all requirements.

Those in search of aids to beauty are assured of an almost bewildering range of preparations which vie with one another in their attempts to cloak a woman's age by preventing those unkind wrinkles, ageing lines and unsightly crow's feet. Obviously, plastics do not enter into the composition of these creams, lotions



salves and what-you-will, but a large number of containers are moulded of plastics and do their part in making cosmetics fit for the dressing table. A very popular outfit this year is the Jane Seymour Beauty Budget Case, holding seven different preparations, the containers of which are all equipped with moulded caps in a most attractive green shade. There are also a large number of plastic beauty containers in the Yardley range and it is no secret that their dainty shape and tasteful colours have contributed a great deal to the popularity of the famous products.

Still on the subject of women's gifts, there are some very lovely dressing-table sets in plastics and each year the British Xylonite Co., Ltd., fulfil many a maiden's unspoken wish. Of outstanding merit is the Marlborough set in grained ivory Xylonite with blue medallion and metal handle, surely a fitting present for any discriminating young lady and rather flattering evidence of the donor's good taste. The well-known firm of Stadium, Ltd., also make fitting contributions to the festive occasion with a moderately priced dressing-table set in mottled onyx. There is also a rather attractive table lamp in the same material which adds a very welcome splash of colour to the dressing table.

What about father? Surely there's something in the plastic lucky dip for him? Whilst men are not catered for so generously by moulders, there is no lack of variety. Electric razors are a very popular choice this year and there are at least half a dozen different makes available, all of them equipped with moulded motor housings. There is, for instance, the Remington Rand, Schick, Speko and several others which can be trusted to tackle the stubbiest beard. Then there are several excellent plastic cameras, such as the Karat, Purma Special and Voightlander Brilliant. Fountain pens galore and any number of smokers' requisites designed to make father, not to mention young Bill, a little tidier in their habits, are now moulded of plastics and, therefore, able to give the maximum service.

A very sensible and practical gift for the home would be one of the new Ekco moulded tables, ideal for bridge or occasional use as an afternoon tea table. Unlike tables with glass or wooden tops, they retain their luxurious polished surfaces indefinitely as the moulded tops are impervious to heat and damp, and neither

6.—Goodwood toilet ware by British Xylonite, Ltd.

7.—Accessories for the smoker by Stadium, Ltd.

8.—Karat camera made by Agfa Photo, Ltd.

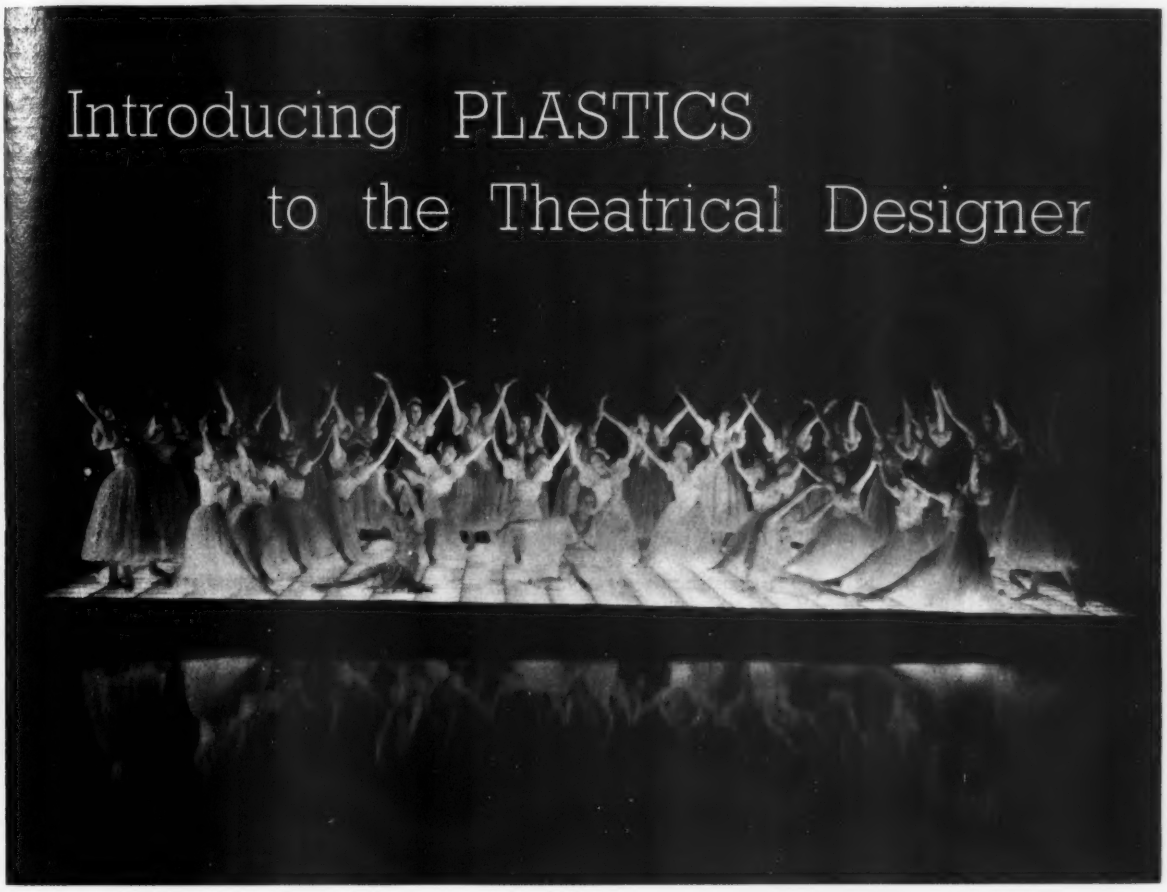
9.—Roulette wheels moulded in Bakelite by Axford Manufacturing Co., Ltd.

10.—Smoker's set by Stadium, Ltd.

liquids nor lighted cigarettes leave any permanent marks. Another most acceptable gift for the home which can be shared by every member of the family and envied by relations and friends is a coloured moulded radio set in one of the several popular shades, such as sea foam. As mentioned in the November issue, British Industrial Plastics, Ltd., are pioneering this revolutionary introduction of colour in radio and they deserve the widest support for their vision and courage.

It is impossible to catalogue any more plastic gifts because the allotted space for this seasonable article is now nearly filled and the printer is waiting for the copy. All that remains to be done is to crowd into a few brief lines a reminder that the Christmas of 1938 promises to make a most acceptable contribution to the prosperity of the industry and a profitable reminder that plastic goods can be trusted to please not only by reason of their usefulness and smart design, but their lively and attractive colour. Yes! the most noticeable characteristic of plastic gifts this year is their colour and at the end of 12 months of worry and anxiety it is a relief to turn away from a sombre and depressing world outlook and feast one's eyes, if only momentarily, on things bright and cheerful.

1.—Onyx radio set by British Industrial Plastics, Ltd.
2.—Temco clock in transparent cast resin.
3.—Table lamp fabricated of Catalin.
4.—Dressing table set made by Stadium, Ltd.
5.—Smoker's companion moulded by Lacrinoid, Ltd.
6.—Remington Rand close shaver.
7.—Snow White hair brush and comb in Bexoid packing.



Dear Mr. Theatrical Designer

TO you, I think, the name plastics may, unfortunately, mean very little, although possibly it might suggest some relation to the plastic arts which you took so much pains to master during those early years at the Art School. To give you an easily understood definition of the materials of our £10,000,000 industry would be difficult, and instead a compromise might be attempted by saying that there are available at the present time at least three groups of synthetic products with theatrical possibilities. The first of these is cellulose acetate sheeting, which is fully transparent and available in roll form of varying widths and almost any desired length. This may be obtained in different thicknesses to suit various requirements.

Apart from the glass-clear variety of acetate there are other grades available in opaque or semi-opaque colours and also fancy effects in pearl, etc. The latest and possibly the most interesting form of cellulose acetate is the fluorescent variety, and some very original effects may be achieved by the use of this material. It glows vividly in the dark when irradiated by invisible ultra-violet light. All types of cellulose acetate are comparatively non-inflammable.

The second group of plastic materials which I think might be of interest to you is "Cellophane." This is also transparent, but unlike cellulose acetate it is available in extremely thin gossamer-like sheets of the type used for wrapping all kinds of food products and packets of cigarettes. You will, I know, Mr. Theatrical Designer, have seen numerous illustrations of glamorous film stars in shimmering "Cellophane" dresses or peeping out coyly from "Cellophane" curtains, the transparency of which is relieved by gold and silver ornamentations. Yes! Hollywood producers have recently gone in for "Cellophane" in quite a big way.

The third and last group of synthetic products which you may possibly care to consider are the so-called cast resins. These are available in extruded rods, tubes, etc., in a great variety of colours, as well as transparent forms, and they can be easily cut and tooled to make all manner of shapes. In addition to the above there are the newer glass-clear resinous products such as Perspex and similar materials, which have so many interesting properties, particularly the ability of solid rods of these materials to allow light to flow evenly from one end to the other, so as to give the effect of a glowing neon tube.

These three or four groups do not, it should be clearly understood, embrace all the varied products of our industry; indeed, they omit both moulded and laminated materials, but they do include most of the materials I think of interest to you.

The question now arises, how can they be used to advantage either for scenery or costumes? This is a question you yourself should really answer, but I might suggest that their application need not be confined to spectacular shows; indeed, as all these plastics encourage one to make a bolder and more dramatic use

of stage lighting they have possibilities for almost every piece from the "Fair of Sorochinsk" to "Charley's Aunt." The point I am so anxious to stress is that these varied materials encourage imaginative and unusual applications and they are so versatile that you need never fear of them falling short of your requirements. A practical point of interest to stage carpenters is that cellulose acetate and all the other types of suitable plastics are easy to cut and work with ordinary carpenter's tools and they can be painted with spirit solutions of various dyes or ordinary oil paints to give any desired effect. If you would like any further advice about specific plastics, I should be pleased to give it, or, what might be more useful still, put you in immediate touch with manufacturers.

Meanwhile, I intend to make an inventory this winter of all shows I see where plastic materials are used, or might have been used with excellent effect. I am starting to-night at Sadler's Wells.

THE EDITOR.

Display Stands of Moulded Asphalt

UNUSUAL high-relief effects have been achieved in several displays prepared for retail distribution in America through the use of the Thermaloid moulding process. Although the process is not a new development, experiments have been conducted as far back as 10 years, it is only now that displays of this type are coming into more general use.

Thermaloid is an asphalt-treated paper somewhat similar to the usual type of asphalt roofing materials. The material undergoes heat and pressure treatment to obtain the high-relief effect, and, in a sense, this resembles the customary plastic moulding process. When the relief has been formed colour is applied by paint spray, silk screen or other accepted processes to achieve striking effects.

The Michelob high-relief plaque has brilliant colours in the original, and is approximately 15 ins. wide and 20 ins. high. The illustration in the left-hand panel, a lithographic reproduction, was labelled in after the moulding process. The wood effect of the barrel staves and the lower portion of the display was secured by moulding. The unit was then paint-sprayed, rolled and hand-painted. The crown reproduced below the illustration was studded with semi-precious stones in recesses made during the moulding operation.

The display for Pedro Domecq provides a space designed to hold an actual bottle of sherry, and it was produced for wall rather than counter display. The bottle is held firmly in position by a rubber band gripping it at the neck. Particularly effective is the three-dimensional reproduction of the hanging grapes.

An important feature of these displays and others produced by the Thermaloid process is their resistance to rough usage, thus adding to the life of the display.

★

At the recent Brewers' Exhibition considerable publicity was given to the use of rubber as a flooring material for hotels, restaurants, etc. A number of new materials were shown, particularly those of value in deadening noise, and a promising type of floor covering on display was a form of carpeting in which the fibres are set in a rubber base, which, among other things, prevents "scuffing out" and ensures better wearing properties. Other applications of rubber shown at the Exhibition included rubber mats, rubber tops for counters and tables, rubber channels for sliding doors, rubber underlays for carpets and buffers, and pads for a variety of purposes. Many of these products are fully described in two booklets, "The Use of Rubber in the Brewing Industry" and "Rubber in Furniture," which can be obtained free on application to the Secretary, the British Rubber Publicity Association, 19, Fenchurch Street, London, E.C.4.

★

Large-scale paintings on the walls of the giant buildings at the New York World Fair are being executed by the famous mural artist Domenico Mortellito in a new chlorinated rubber base paint. Two years ago Mortellito employed a rubber paint for painting habitat decorations for elephant, rhinoceros and bird cages at the National Zoological Park in Washington, but he found a number of drawbacks in its use. As a result of collaboration with the Essex Chemical Co., Newark, N.J., a new type of chlorinated rubber paint was produced, which is greatly superior to the old variety.

★

During the past 12 months considerable publicity in printing circles has been given to the claims of rubber inks, of which two varieties are available, non-drying and drying. These are being made in America by subjecting raw rubber or specially selected vulcanized scrap to high temperatures (above 250 degrees centigrade), and then mixing, compounding and grinding the liquefied rubber with suitable pigments, dyes, etc., to form the required ink. The rubber inks have no swelling action on rubber plates and are now being widely specified; in addition, they find many applications for labelling or marking, and may be used very successfully for the decoration of rubber footwear.

★

Information which has just reached us from America shows that synthetic rubber is now being carefully considered by motorcar manufacturers in the United States. In drawing up plans for its 1939 car, one company was faced with the problem of securing a low cost gasket material which would provide a perfect oil seal between the chain plate cover and the housing protecting the camshaft drive. Research on this problem produced a new and very tough gasket material by impregnating special carton paper with liquid "Thiokol" cement. This rubber-impregnated paper was completely oil-proof, and because it flowed under pressure, resulted in giving a perfect oil seal. In the works it was found that a single stamping operation was all that was required to produce gaskets measuring 12 ins. by 9¾ ins.

★

Neoprene is now being used for insulating the ignition cable of commercial vehicles, so as to withstand the action of ozone and the deteriorating effect of oil, heat and abrasion. The Packard Electric Division of the General Motors Corp., U.S.A., are now developing the use of Neoprene for this specialized purpose with great success.

★

A number of seasonable rubber gifts can now be seen in the shops, and they clearly show the keen interest now being taken by manufacturers in adapting even the most commonplace wares to meet the requirements of the festive occasion. Hot-water bottles are good examples of the imagination shown by designers and makers. One of the most popular just now is the hand-made bottle provided with a fabric insertion that ensures a long and busy life. It is fitted with a non-splash funnel and a patent stopper to facilitate easy filling and safe handling. Bottles in the shape of toys are also proving attractive and popular gifts for the children, and most of them have a cover of some kind of plush or other suitable fabric.

★

A new type of fuel and oil hose utilizing a flexible metal core protected by "Cellophane" cellulose film and Neoprene chloroprene rubber has been developed primarily for use in aircraft, although it is well adapted for other industrial uses. It is a lightweight hose made to withstand vibrations and strains and to resist deterioration from contact with oils. Wound spirally around the core are laminated sheets of "Cellophane" which provide an impervious oil seal. This is covered with a tight-fitting jacket of vulcanized Neoprene, which resists oil and heat especially well. Metal braid forms the outer shell. The "Cellophane" and the Neoprene are Du Pont products. The Chicago Metal Hose Corporation, of Maywood, Illinois, makes the hose under the trade name of Avioflex, and considerable interest is being taken in the product not only by the air passenger services, but also various State departments.

Unlimited Ideas for Limited Companies

PLASTIC moulded goods are the answers to many an industrialist's prayer for the solution to the Christmas Business Link. Many ideas, which previously could not be manufactured economically, have been rendered possible merely because of the advent of modern plastics.

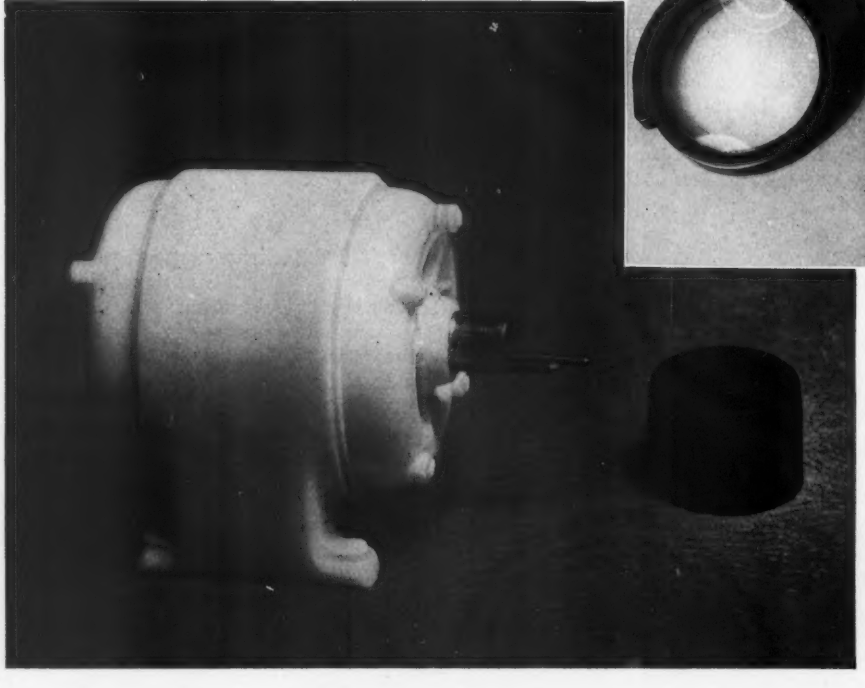
DEAR SIRS,—What do you manufacture? Is it steam engines or sausage skins, rocking horses or galvanized tanks, perfumes or tin-tacks? It doesn't matter what you produce, I can help. This sounds very egotistical and rather like one of those mysterious concerns we see advertised in cautious terms, but I am not offering you £10,000 on your note of hand alone, nor am I offering to tell you how to produce your sausage skins and steam engines at half the cost you do at present. It's nothing like that. It's merely to tell you to look ahead to Christmas, 1939. And when I say I can help, I really mean the plastic trade can help.

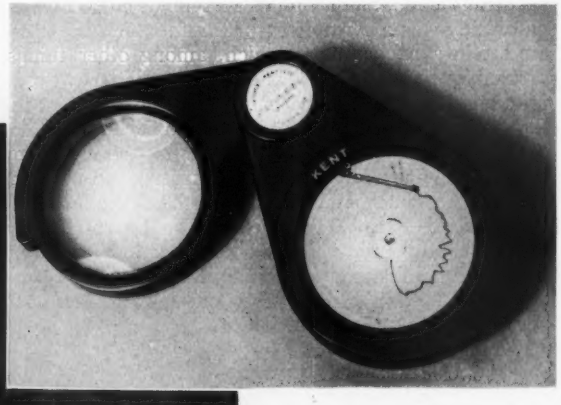
Round about this month you are apt to become, shall we say, rather soft-hearted. There's an air of goodwill to all men about the place, and one of your clerks is extremely worried in the compilation of a long list of your customers who are to receive at Christmas some memento for having given you their business in the current year.

I do not know, of course, what method you adopt in impressing upon these customers how pleased you are with them and that you want to keep up that pleased feeling. If you are very wealthy you may send them along a Rolls-Royce each, or it may be, if you are not so wealthy and consider the Rolls-Royce a rather ostentatious present, a case of whisky or a barrel of oysters.

Let us consider in detail the case of whisky and the barrel of oysters. Personally, I do not consider these presents as being just what your customers want. Don't forget that they will think of you and your company only so long as the contents last. If you sent me a case of whisky how long do you think my kind thoughts of you would linger? As for oysters, why I can't even open the things properly and always get small pieces of shell into my mouth. No, it's all wrong. You must choose something that will last—something that will please all the family. Think how delighted your customers would be if they received instead a nice little calendar in pink and green synthetic resin with the name of your firm, "The Universal Potato-peeler Manufacturing Co., Ltd.," tastefully inlaid in orange on the top. He'd have this in front of him all the year round! Think what an advertisement this would be for you, and think what new friends you'd make!

Seriously, however, the "Christmas Business Link," as I termed this type of memento last year, deserves

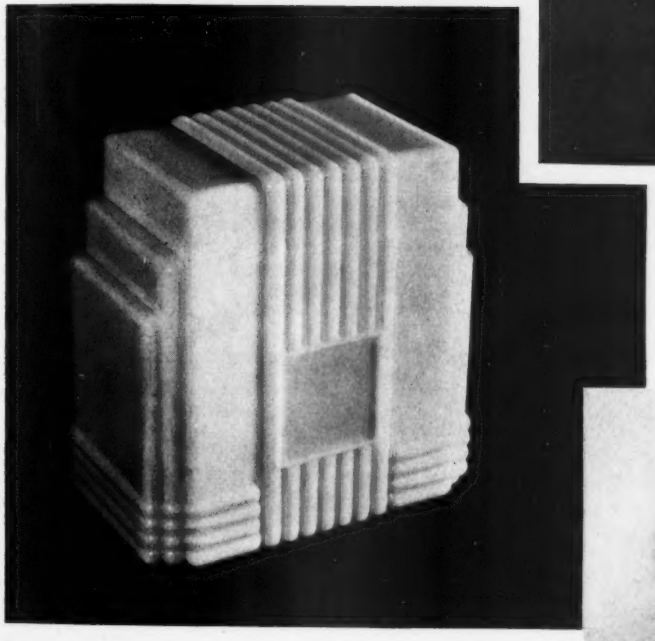


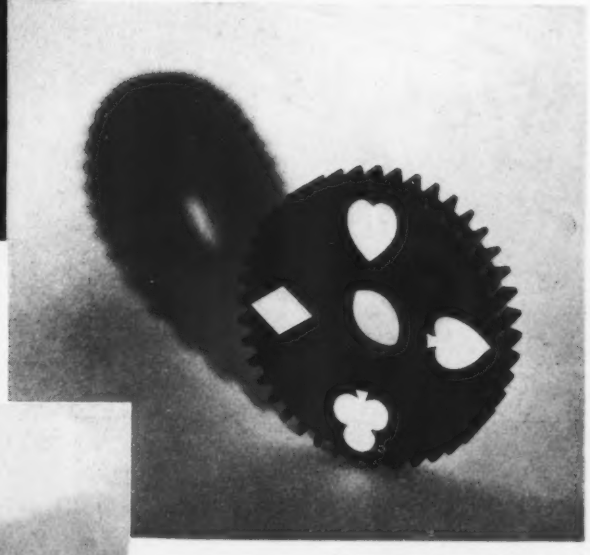


These mementoes are used by two big industrial firms. Above, by George Kent, Ltd., and, left, by Brook Motors, Ltd. The great advertising "pull" of these is obvious.

Two safety razors, moulded by Souplex, Ltd., for use on thirsties only!

A cigarette or jewel box made to represent a miniature radio cabinet. Moulded of amino-resin powder by Amalgamated Wireless (Australasia), Ltd.





This gearwheel might form the basis of several ideas.

Butterfields, the famous tank manufacturers, send out an ashtray almost as big as a young tank.

your earnest consideration, especially because the cost is so reasonable that it becomes possible to send them to all your customers; in fact, the more customers you have the cheaper, relatively, does this method become.

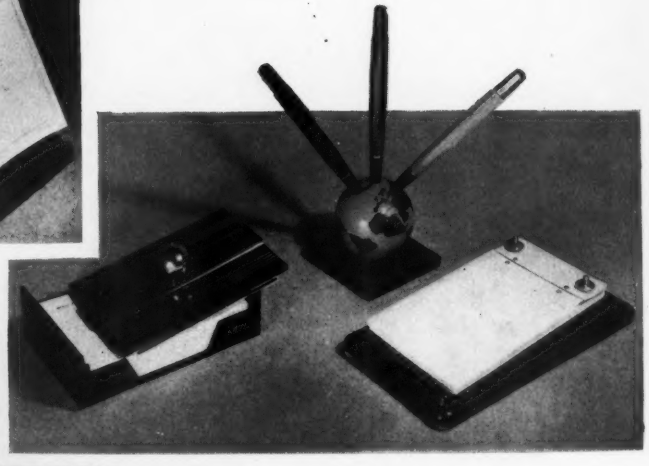
From an advertising point of view, it is far better to create a novel idea round your products. Unfortunately, or perhaps fortunately for those who think of them, the really novel and intelligent idea is extremely rare. However, let us see what has already been done. Let us take the example of George Kent, Ltd.; a company famous in chemical and engineering circles; in fact, wherever it is necessary to know and to record the quantity of a flowing material passing through a pipe or other conveyance in a specified time. Obviously the customers of this concern are technicians, so that what more acceptable gift can be given them for everyday use than a magnifying glass, to examine more closely raw materials, surfaces of metals, small drawings and print? This type of memento George Kent, Ltd., have issued and have enclosed the glass in a protective holder admirably suited to illustrate their flow recorders. In the photograph shown the casing has in miniature the same shape as a water-metering recorder, the circular drawing showing the recording sheet, pen and the oscillating curve of the quantity of water flowing through a tube during each hour of the 24. As a modern piece of advertising, this is a superb example. It is, of course, made of synthetic resin.

Brook Motors, Ltd., make electric motors, and they are very famous for them. They have recently sent to their friends a very interesting gadget beautifully moulded of Beetle and Scarab. It does not need much to remind the recipient of the electric motor manufacturers, and since it is a paper weight and a holder for pencil refills it is continually in use. I was so pleased with the one I received that I bought a couple of electric motors out of sheer enthusiasm, just to keep about the place "in case."

I must show you what I consider one of the high spots in this type of present. The two safety razors which are shown in one of the photographs are moulded from phenol-formaldehyde moulding powders. I have used one of them for a year or so, and, provided I put in a new razor blade now and again, shaves as well as it ever did. Mine is the Guinness one, as you may have guessed, and not the soft-drink one, although I understand the latter shaves just as well. Think of the joy of shaving every morning! Every day it reminds me that Guinness is good for me.

There are literally thousands of these ingenious possibilities at your command. Are you a radio manufacturer? Well, then, here's a miniature radio in pastel-coloured plastic which your lady customers can use as a jewel box or cigarette box. Are you a maker of gearwheels? Here I've made a very simple suggestion for making a "trump" indicator for bridge players.

(Left) Temple Press Ltd. have had more than 6,000 of these moulded calendars and pen-rests made for free distribution to friends.



Sculthorpe Sawyer, Ltd., who send the above, have lots of ideas for the industrialist.

Westinghouse Electric have sent me the attractive note pad shown on the left.

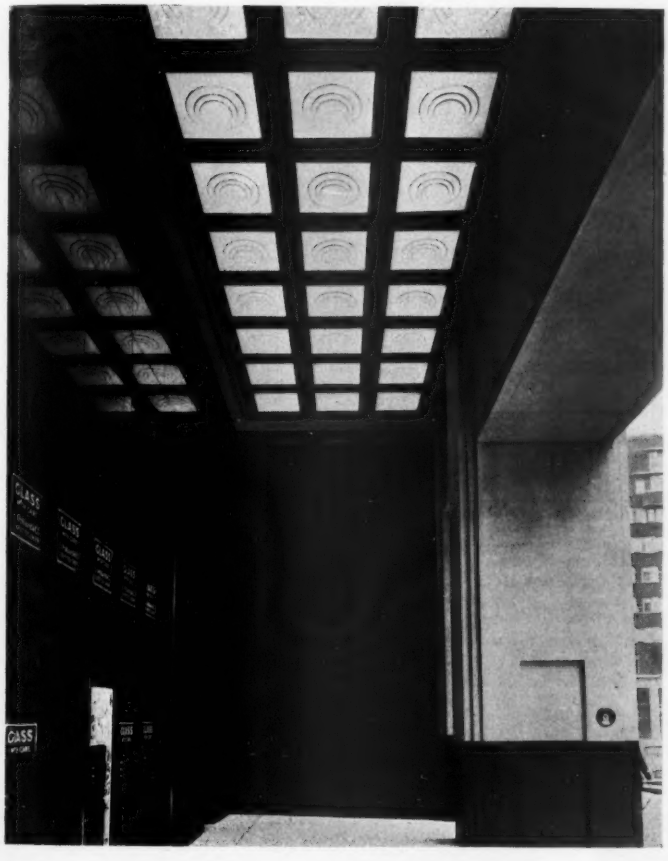
The wheel would, of course, have to be mounted suitably with an indicator.

There are much simpler gadgets, too. For example, the well-known firm of Butterfields, the tank makers, sent round moulded cigarette ashtrays with a nice deep well to remind people that Butterfields are *the* tank makers. There are also myriads of forms in which writing pads, pencil holders and similar useful implements can be made with your name stamped on them. Sculthorp Sawyer, Ltd., have sent me some of this type which they are producing. Mr. Madden, of Westinghouse Electric International Corporation, has sent me a beautifully moulded desk pad made from phenol-formaldehyde resin moulding powder, which his company send to their distributors and other friends.

So you see there is ample to choose from. If you are interested, any moulding concern would be glad to co-operate and give you ideas on the subject of your own especial requirements.

Yours very truly,

THE EDITOR.



A STUDY IN LIGHT AND SHADE

Perspex, the more than glass-clear plastic sheet, has become a material of construction for the building trade.

AN original feature of the new building in Berkeley Square constructed by Sir Robert McAlpine and Sons is the portico roof lighting system which is constructed in "Perspex" synthetic resin sheet made by I.C.I. (Plastics), Ltd.

Thirty-nine panels each 3 ft. square are arranged in three rows of thirteen carried in metal bearers. Each panel is a separate unit and is provided with handles to facilitate removal for cleaning. This work is further simplified by the fact that a panel weighs only 10 lb., and once dropped into place requires no further fixing. The panels are joggled in three steps and the inside surfaces are sand blasted all over except for three concentric bands which are left clear. The moulding and sand blasting were carried out by Messrs. Plastilume Products, Ltd., to the design of Messrs. Gordon Jeeves and Hector Hamilton.

During the day the high light transmission of "Perspex" provides adequate illumination without assistance from an artificial source. By night the roof is lit by an arrangement of fluorescent tubes which provide the whole entrance with a most satisfactory illumination.

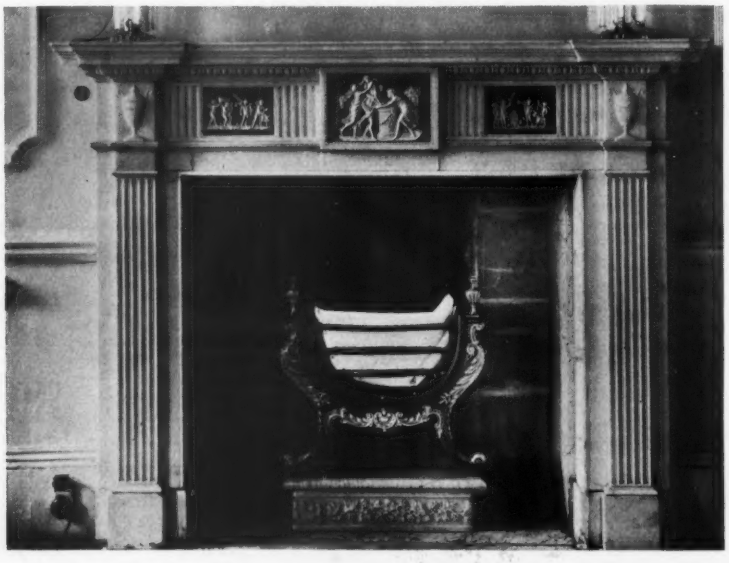
The material, "Perspex," is strong and homogeneous and receives no assistance from wire mesh or other strengthening interlayer. It can be moulded to almost any desired shape by the application of heat and the use of suitable formers. "Perspex" possesses high impact strength and should, therefore, be reasonably proof against explosive blast and other tendencies to shatter. Since its stability is high and its moisture absorption is very low, there is no danger of its discoloration or distortion as a result of age or climatic conditions. The introduction of "Perspex," therefore, to the building trade may provide some new ideas in the design of lay-lights and other architectural fittings.

JUST TO REMIND YOU

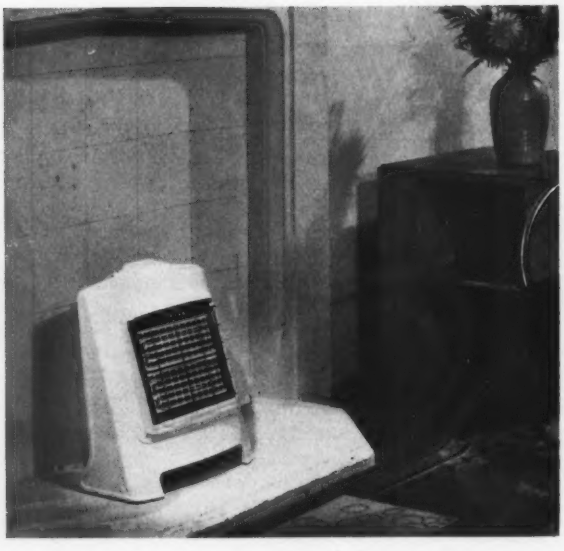
IN the middle of the 18th century there lived four brothers Adam who were destined to leave an enduring mark not only on British architecture, but also on English furniture. The greatest of these brothers, Robert, was strongly under the influence of Roman and Greek architecture, and as the *Encyclopædia Britannica* says, "It was the signal triumph of his genius that he was able so to mould and adapt classical models as to create a new manner of the highest charm and distinction." As for furniture and interior decoration . . . "An Adam house is a unique product of English art. From façade to fire-irons, the chimneys to carpets, everything originated in the same order of ideas, and to this day an Adam drawing room is to English what a Louis Seize room is to French art. In nothing were the Adams more successful than in the fine proportions of their mantelpieces and doors. The former, by reason of their simplicity and the readiness with which the 'compo' ornaments can be supplied and painted, are still made in cheap forms."

Alas, the Adam houses are being rapidly destroyed and with them their mantelpieces and fireplaces are disappearing. They no longer fit into the modern world, which demands efficiency above all things and an art line very different from the scrolls, leaves and pillars of those far-off leisurely times when servants were two a penny.

Modern heating devices are peculiarly adapted for 1938. They are produced with a main eye to results and to our modern ideas of beauty, simplicity and safety. The two modern specimens shown are both encased in plastics, one of ivory amino-resin moulded by G.E.C. and the other in phenol-formaldehyde resin moulded by E. K. Cole, Ltd.



(Left) Adam mantelpiece. Photo reproduced with kind permission of Pratt and Sons, Ltd.



PLASTICS FOR MODERN WINDOW DISPLAYS

A Glimpse at Students' Work at the Recent Reimann School Exhibition

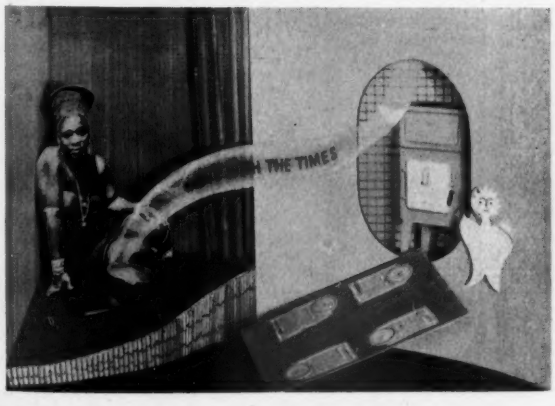
The pools of water at the base of this exhibit are made up of "Cellophane" sheets.

Rhodoid and rubber tubing helped to build up this attractive display for fabrics.

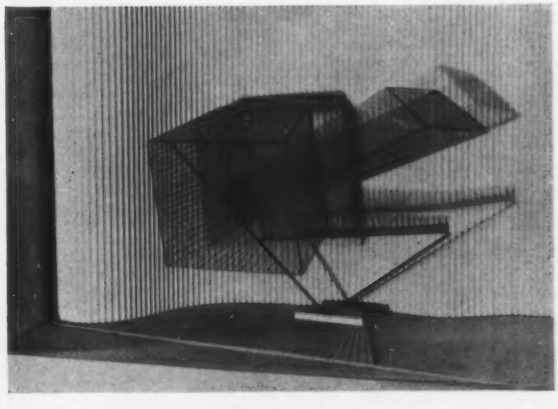
THE claims of cellulose acetate and "Cellophane" for the modernistic treatment of window display are now generally acknowledged and it is, therefore, a welcome sign that tutors at one of the most progressive fashion, photographic and display schools in London should encourage their students to use these promising materials. At the annual exhibition of students' work which was held at the school from November 15 to November 30, a number of displays were shown which made use of transparent plastic materials for realistic and dramatic effects, attained with the simplest designs and at the minimum of expense.

The excellent training given to students was clearly evident by reason of the high standard of all of the exhibits, many of which could be studied to good advantage by professional window dressers.

The design sections are planning an ambitious programme for 1939 and hoping to be able to evolve a number of new ideas for plastics in the packaging field. While it is pleasing to us that these thermo-plastic materials are now being recognized as of importance to this growing industry, we hope that future developments will include Perspex, the vinyl resins and also thermo-setting plastics.



An ingen'ous display for Mr. Therm embodying the use of acetate material.



A study in the abstract made possible by the use of Rhodoid sheets.

PRODUCTION

Practical Information dealing with Raw Materials, Moulding and Forming of all types of Plastics—Thermo-Hardening and Thermo-Plastic—Works-Organization, New Plant and Control Apparatus

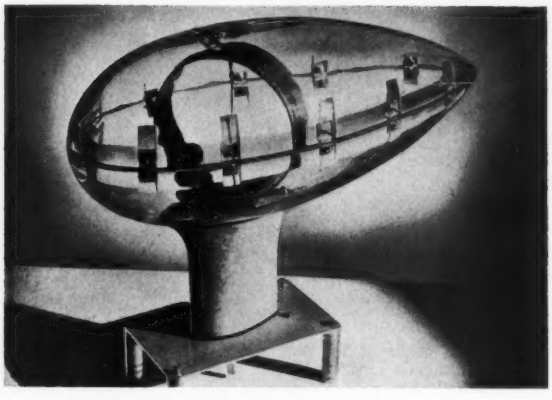
NOTES AND COMMENTS

Prize Designs

EVERY year *Modern Plastics*, the well-known American monthly, holds a competition for the best designs of finished goods made in plastics. The goods are considered under various sections: Industrial, Transport, Scientific, Decoration, Household and Novelty goods.

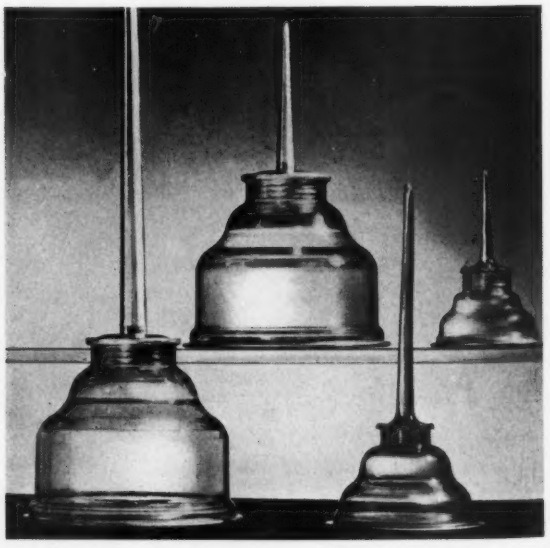
The present year has been one of many fruitful ideas in the U.S.A. and more than ever plastics are proving their worth in every sphere of life. The following photographs show only a few of the prizewinning manufactures.

The first is that of a rotatable direction-finding radio compass loop, or goniometer, enclosed in a transparent housing for mounting on the fuselage of an aeroplane. The housing allows minimum drag, protects the loop from air-stream forces and from snow and rain. It is strong, withstands sudden changes of temperature, is light in weight and has high electrical insulating properties. The housing is moulded from Crystalite, an acrylic resin by Insulation Mfg. Co., the loop form is of laminated Synthane and is mounted on a block of Lucite, also an acrylic resin made by E. I. du Pont de Nemours and Co. Inc.



The first prize in the Industrial section goes to the Lamson Co. Inc. for their Pneumode despatch tube terminal and carrier. The tube is used to carry messages, documents, orders and cash from one point of a store or factory to another. The transparent body has obvious advantages. The terminal itself is of Bakelite, manufactured by the Bakelite Corporation, and the carrier of Monsanto CA, a transparent cellulose acetate made by Monsanto Chemical Co.

We also illustrate the first prize in the Novelty section, because it is an excellent example of the importance of



making things visible, and in this instance of showing when the contents are low. The transparent oilcans are moulded by Universal Plastics Corporation from Lumarith, a cellulose-acetate material made by the Celluloid Corporation.

Spraying Resins

THE spraying of lacquers by means of a spray pistol has been employed almost ever since nitro-cellulose lacquers were discovered. Spraying of metal from pistols to form metallic films has been employed for at least 10 years.

The two methods differ by the fact that the lacquers are merely forced from a nozzle by air pressure, while the metal is passed through a hot flame and subjected to air pressure.

These two methods have been in the minds of scientists, who have hoped to use a similar method in applying certain resins direct instead of first dissolving them in solvent. Workers in the London Shellac Research Bureau appear to have been first in the field in this respect and have obtained some startling results. The material used is the hard lac resin obtained from ordinary shellac, a resin which has a much higher water resistance than the ordinary shellac from which it is produced. The hard lac in powdered form can be fed into a pistol, and by air pressure through a flame can be sprayed in liquid form on to a surface such as wood or metal. A tenacious and fairly smooth film is formed with the usual excellent electrical properties of this natural resin and good water-resistant properties. The process has been employed for making laminated tubes for electrical purposes. There is some loss, amounting to 10 per cent. to 20 per cent. of the material, by burning on passage through the flame.

These results are so interesting that one is tempted to hope that similar methods may be possible using synthetic resins of the phenol or amino type. There would be no difficulty, we believe, in feeding the powder through the pistol, nor even a mixture of such a powder with, say, asbestos fibre. The difficulty would be to obtain a curing of the film. Regulation of the temperature might help, while the inclusion of special catalysts would aid in bringing about the desired result.

Obviously the matter is no simple one, but if success were achieved, one can visualize the opening up of new uses of the materials produced by our industry.

Synthetic Resins for Export

THE following interesting notes have been taken from the *Manchester Guardian Commercial* of November 11:—

"All types of synthetic resins and plastics have made such rapid progress in recent years that production figures, which only a short time ago stood as records, now seem small. At the same time, however, prices of most materials of this class have been reduced to such an extent that the value of the output has by no means increased at a similar rate. This is best seen in the export trade in synthetic resins. The exports of the world's five leading producers—Great Britain, Germany, the United States, Belgium, and France—were £3,000,000 in 1929; last year they totalled £4,500,000. In 1929 Germany supplied more than half the world's total exports; last year her share was 30 per cent. only, and shipments from the United States were almost equal to those from Germany, while this country, France, and Belgium, contributed rather over 10 per cent. each. The leading export markets for synthetic resins are in Europe, and, as is often the case in the early stage of chemical developments, the chief producing countries are also the principal importers.

Plastics from Raw Silk

ACCORDING to the *Textile Weekly*, November 11, the largest silk-producing and exporting firm in Japan, Messrs. Katakura and Co., is reported to have patented a process for the manufacture of plastics from raw silk. The process in brief is that the raw silk, without being degummed, is impregnated with water to 10-23 per cent. of its volume. By the application of high pressure to the accompaniment of heat, the mass thus produced can be pressed to any desired shape. The sericin in the silk gradually dissolves and glues the fibres together. After being cooled and dried the product is ready for working-up. It is very resistant to acids, withstands temperatures up to 130 degrees C., and is also resistant to oil. Moreover, it possesses great compression strength and elasticity, sound insulating power and low specific gravity. Production costs can be kept low by using waste cocoons which are unsuitable for the manufacture of textile fibres.

British Standard Specifications

(1) B.S.S. 815—1938. Under-floor Non-metallic Ducts for Electrical Services, with Fittings.

Announcement was made by the British Standards Institution in June last of the publication of B.S. 774, Under-floor Steel Ducts for Electrical Services, with Fittings, and reference was then made to a further Specification, in course of preparation, for Non-metallic Ducts for similar purposes.

Announcement is now made of the publication of this latter Specification as B.S. No. 815, Under-floor Non-metallic Ducts for Electrical Services, with Fittings.

The services for which such ducts may be required are as follow:—

Lighting (general lighting, local lighting, desk lighting, etc.).

Communication (G.P.O. telephone system, intercommunication, telephones, bells, signals).

Power (small power for office machines, such as comptometers, etc.).

Heating (local heating points).

The Specification covers material, with suitable tests, tests for galvanizing, sherardizing, enamelling, continuity of bonding devices, etc.

In the present state of development the committee responsible for the preparation of the Specification considered it to be inadvisable to lay down standard shapes and sizes and, therefore, in the present issue, recommended sizes only are included.

(2) British Standard for Ceiling Roses (B.S. No. 67).

Nine years have elapsed since the last revision of B.S. 67, Two- and Three-terminal Ceiling Roses, and during this period ceiling roses having dimensions of parts considerably smaller than those hitherto specified, and in many instances following different methods of design, have been produced. Provision has been made for these in a revised issue of the Specification just announced.

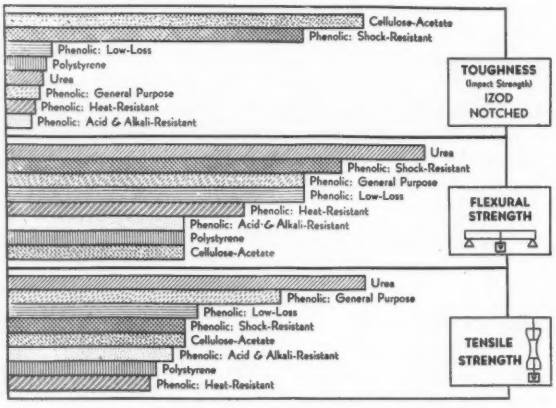
A new section, giving requirements for ceiling roses made of synthetic-resin mouldings, has been added.

Copies of the revised Specification (No. 67—1938) may be obtained from the British Standards Institution, 28, Victoria Street, London, S.W.1, price 2s. 2d. each.

Selection of Various Plastics

AN informative and easily used set of diagrams and tables was presented and certain rules relating to moulding were given in a paper presented before the Franklin Institute, Philadelphia, Pa., on October 18, by C. W. Blount, assistant sales manager of the Bakelite Corporation. The paper dealt only with those types of plastic now being offered by this company, namely, phenolics, ureas, cellulose acetate and polystyrene types, but much of the information, being in graphical form, is highly convenient for use in an average run of cases involving the selection of plastics best suited for various needs. It may be noted, however, that references to such plastics as nitrocellulose, acrylic, vinyl and cold-moulding forms are omitted and that cast phenolics and laminated materials are not included.

FIG. 1A



The author points out that, although the values given are based on data derived in testing standard specimens, strength and other properties may vary when parts of other dimensions are moulded, hence the data are of value chiefly on a relative basis. Since there are different varieties or grades of material in each type of plastic, what are termed "average optimistic" values are taken, it being understood that special grades of certain materials can be had and that, for special purposes, such materials may be chosen and prove satisfactory when an "average" type would not.

Fig. 1A shows the relative toughness (based on impact strength), flexural strength and tensile strength of the plastics considered. Engineers often make the mistake of asking for materials of high-tensile strength when what is required is maximum toughness. It is observed that cellulose acetate (of the average grade considered) rates highest in toughness but is fourth in tensile strength.

In Fig. 1B the plastics are rated numerically as to colour fastness and resistance to cold flow. The ureas, it is pointed out, are unaffected by light exposure when made with proper dyes in light colours. Cold flow is important in assemblies involving pressure, as of rivets or screws which may become lose if flow occurs. Acetates are subject to considerable cold flow, whereas phenolics are not.

Effects of heat and flame are shown in Fig. 2.

FIG. 2

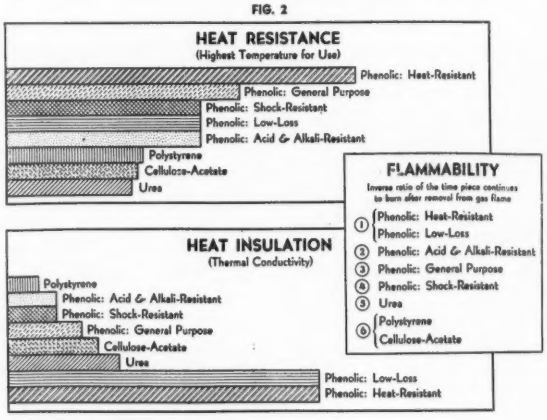


FIG. 1B

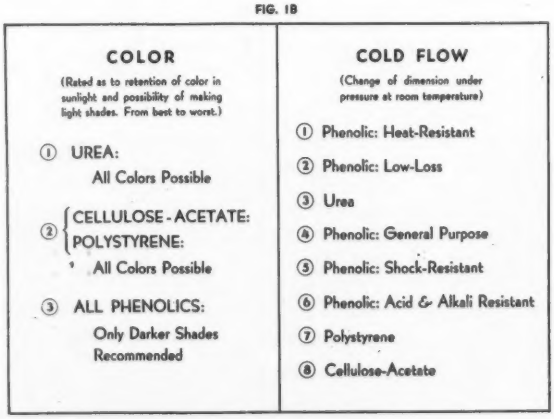
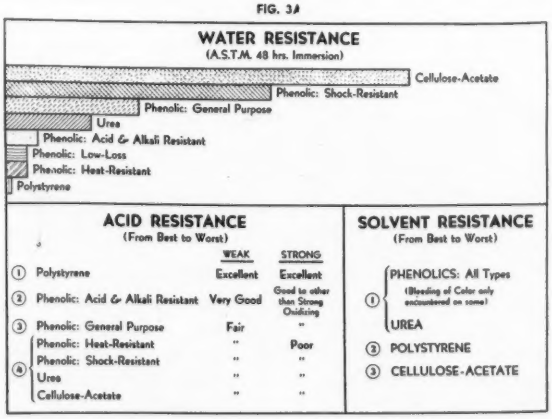


FIG. 3A



Relative values under "Heat Resistance" indicate relative temperatures at which the plastics can be used continuously without serious effect upon their properties. It is pointed out that, although urea is rated below acetate, a cup moulded of the latter would soften if filled with hot coffee, whereas urea in the same form would remain satisfactory. Flammability rating is arrived at by holding a specimen in a bunsen-burner cone for one minute, removing it and recording the time required for the flame to go out. All the plastics listed are poor heat conductors, the author indicates, but he does not consider them satisfactory heat insulators.

Relative resistance to water, acid and solvent are shown in Fig. 3A. Although the author does not so indicate, this figure presumably shows the relative amount of water absorbed in 24-hour immersion, acetate absorbing most and polystyrene least. Order of merit

FIG. 3B

CAUSTIC RESISTANCE
(From Best to Worst)

	WEAK	STRONG
① Polystyrene	Excellent	Excellent
② Phenolic: Acid & Alkali Resistant	Very Good	Poor
③ Urea	Fair	"
③ Phenolic: General Purpose	"	"
③ Phenolic: Low-Loss	"	"
③ Phenolic: Heat-Resistant	"	"
④ Phenolic: Shock-Resistant	Fair	Very Poor
④ Cellulose-Acetate	"	"

DIMENSIONAL CHANGE AFTER MOLDING
(From Lowest to Highest)

① Phenolic: Heat-Resistant
② Phenolic: Low-Loss
③ Polystyrene
④ Phenolic: General Purpose
⑤ Phenolic: Acid & Alkali Resistant
⑥ Phenolic: Shock-Resistant
⑦ Urea
⑧ Cellulose-Acetate

is shown in the listing on acid and solvent resistance, and the same is true of caustic resistance and dimensional change (Fig. 3B). The latter refers to the period immediately after moulding in the process of cooling to room temperature, this shrinkage varying from 0.002 in. per in. to 0.012 in. per in.

Weight per unit of volume (specific gravity) is given

FIG. 4

WEIGHT PER UNIT VOLUME
Specific Gravity
(From Lightest to Heaviest)

Phenolic: Heat-Resistant
Phenolic: Low-Loss
Urea
Phenolic: Shock-Resistant
Cellulose-Acetate
Phenolic: General Purpose
Phenolic: Acid & Alkali Resistant
Polystyrene

HARDNESS
(From Hardest to Softest)

① Phenolic: Heat-Resistant
② Phenolic: Low-Loss
③ Urea
④ Phenolic: Acid & Alkali Resistant
⑤ Phenolic: General Purpose, Phenolic: Shock-Resistant
⑥ Polystyrene
⑦ Cellulose-Acetate

in Fig. 4, as is also the order of hardness. The hardness of glass cannot be secured in plastics, but harder materials than the heat-resistant phenolic listed can be secured on special order.

Dielectric properties are listed in Fig. 5. Relative loss factors are given on the basis of that for polystyrene, being taken as unity (1). Loss factors become serious as frequencies increase. Resistivity relates principally to direct-current uses and all the materials listed are satisfactory for direct-current applications, but the ratio of 10 million to nine is surprising in comparing polystyrene with general-purpose phenolics. Dielectric strength is given at 60 cycles, but as dielectric strength is affected adversely by heating, which may result with alternating current if the loss factor is high, there are cases in which a specification of dielectric strength alone is not adequate.

The table in Fig. 6 is in part a composite of data in other figures, but includes an additional rating in respect to mouldability around inserts. This refers to ability to take an insert, anchor it firmly and retain it without having the plastic crack around it. It was explained that, by using this table, one can judge in a general way which of the plastics listed is best for a given use when the primary requirements are known.

FIG. 5

DIELECTRIC STRENGTH

Urea
Polystyrene
Phenolic: Low-Loss
Phenolic: General Purpose
Cellulose-Acetate
Phenolic: Acid & Alkali Resistant
Phenolic: Heat-Resistant
Phenolic: Shock-Resistant

ELECTRICAL INSULATION PROPERTIES
Power absorbed by Insulation Relative Loss Factor
(From Lowest to Highest)

	60 Cycles	1,000 Cycles	1,000,000 Cycles
① Polystyrene	1	1	1
② Phenolic: Low-Loss	458	230	115
③ Cellulose-Acetate	500	900	733
④ Urea	740	670	600
⑤ Phenolic: General Purpose	10,000	2,800	1,000
○ Phenolic: Acid & Alkali Resistant	—	—	Not Controlled
○ Phenolic: Heat-Resistant	—	—	"
○ Phenolic: Shock-Resistant	—	—	"

RESISTIVITY
Lowest is considered 1 and Balance is Tabulated Relatively. Rated from Highest to Lowest
(All are Good Insulators for Direct Current)

① Polystyrene	10,000,000
② Phenolic: Low-Loss	10,000
③ Phenolic: Acid & Alkali Resistant	3,000
④ Urea	2,000
⑤ Cellulose-Acetate	500
⑥ Phenolic: General Purpose	9
⑦ Phenolic: Heat-Resistant	2
⑧ Phenolic: Shock-Resistant	1

Another factor greatly affecting the choice among the plastics listed is that of price. Parts produced from general-purpose phenolics are cheaper than those from urea, the rating of the thermosetting materials being: (1) general-purpose phenolic, (2) heat-resistant phenolic, (3) urea, (4) low-loss phenolic, (5) acid and alkali-resistant phenolic, and (6) impact-resistant phenolic.

FIG. 6

PLASTIC MATERIAL	Toughness (Impact Strength)	Flexural Strength	Tensile Strength	Color	Cold Flow	Water Resistance	Acid Resistance	Caustic Resistance	Solvent Resistance	Dimensional Change on Aging	Heat Resistance	Flammability	Heat Insulation (Thermal Conductivity)	Weight per Unit Volume (Specific Gr.)	Hardness	Loss Factor (Range of Frequencies)	Resistivity	Dielectric Strength	Mouldability Around Inserts
Phenolic: General Purpose	⑥	③	②	③	④	⑤	③	③	①	④	②	③	③	③	⑤	⑤	⑥	④	①
Phenolic: Low-Loss	③	③	③	③	②	②	③	③	①	②	③	①	⑥	⑥	②	②	②	③	①
Phenolic: Heat-Resistant	⑦	④	⑦	③	①	②	④	③	①	①	①	①	⑥	⑦	①	○	⑦	⑤	①
Phenolic: Acid & Alkali Resistant	⑧	⑤	⑤	③	⑥	③	②	②	①	⑤	③	②	②	②	④	○	③	④	②
Phenolic: Shock-Resistant	②	②	④	③	⑤	⑥	④	④	①	⑥	③	④	②	④	⑤	○	⑧	⑤	①
Urea	⑤	①	①	①	③	④	④	③	①	⑦	⑥	⑤	⑤	⑤	③	④	④	①	③
Polystyrene	④	⑤	⑥	②	⑦	①	①	①	②	③	④	⑥	①	①	⑥	①	①	②	⑤
Cellulose-Acetate	①	⑤	④	②	⑧	⑦	④	④	③	⑧	⑤	⑥	④	③	⑦	③	③	④	④

Of the two thermoplastics listed, polystyrene is the more expensive by the lb. and cubic in., but in at least some instances a higher production rate with polystyrene has offset the cost differential. Moulds for cellulose acetate and polystyrene are, roughly, 40 per cent. of the cost of moulds for phenolics, and this saving may offset the higher cost of the acetate if quantities are small. With large quantities, the lower cost of phenolics and amino moulding powders often results in important net savings.

Inquiries and General Correspondence

Plastic Milk Bottles

Guildford.

The Editor, *Plastics*.

Dear Sir,—In your October, 1938, issue of *Plastics* we notice an article entitled "Milk-oh!" referring to plastic milk bottles. We should very much like to know the name of the firm experimenting and making these bottles, so that we can get in touch with them.

HOME COUNTIES DAIRIES, LTD.

[EDITOR'S NOTE.—In the editorial quoted we gave all the information we have. The interested financial concern is London Industrial Finance Trust, Ltd., 1, Farleigh House, Lawrence Lane, London, E.C.2. Apparently satisfactory experiments have been made, but, so far as we know, there is no factory manufacturing plastic milk bottles. We advise your getting in direct touch with the above-mentioned company, for obviously they would be glad of your reactions to the proposed object.]

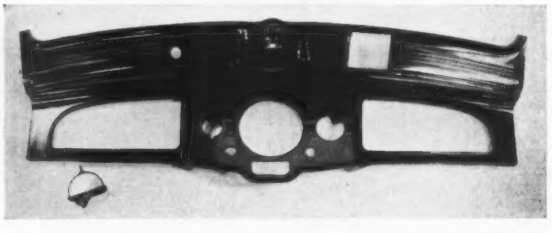
Motorcar Facia Boards

Coventry.

The Editor, *Plastics*.

Dear Sir,—In your issue of November you review the use of plastics at the last Motor Show. In case the plastic facia board, as used on the new Minx, was overlooked, we enclose photographs of this new and interesting moulding.

This company foresaw the great possibility of plastics for internal car decoration and adopted plastic window moulding in 1936. Our experience after using over 400,000 of these mouldings made us decide on the one-piece moulded facia panel. It also influenced our associated company, Sunbeam-Talbot, who incorporated a one-piece facia panel in their latest models.



The facia board of the new Hillman Minx.

We believe that the Hillman Minx incorporates the largest one-piece moulding used on any car. It is certainly the largest moulding on any British car. The improvement of internal finish, coupled with its practical nature, lightness and sound-insulating qualities, have been favourably commented upon by the trade. The design of the moulds and the actual moulding itself are carried out by De La Rue, Ltd., to whom we are greatly indebted.—Yours faithfully,

H. HEATH, Director.
The Hillman Motor Car Co., Ltd.

[EDITOR'S NOTE.—We are pleased to get from Mr. Heath his expression of confidence in plastic mouldings. We made special reference to the Hillman Ten and Minx in our description of the 1937 Motor Show and to the Sunbeam-Talbot in our September, 1938, issue.]

Woodflour in Rubber Floorings

Luton.

The Editor, *Plastics*.

Dear Sir,—I should be glad if you would inform me if woodflour is employed, or can be employed, as an ingredient in making rubber floorings. G.H.S.

[EDITOR'S NOTE.—We have approached Mr. W. S. Dahl with this question, who has replied by giving us the following formula, which has, we understand, proved successful:—

Crêpe rubber	...	100 parts	Woodflour 200 mesh white softwoods fir	...	160 parts
China clay	...	30 ,,	Whiting	...	50 ,,
Lithophone	...	30 ,,	Zinc oxide	...	10 ,,
Paraffin wax	...	2 ,,	Stearic acid	...	2 ,,
Sulphur	...	2.5,,	Vulcatex fast blue B.S.	...	4 ,,
Nonox N.S.	...	1 ,,	Vulcafor F.	...	1 ,,

Cure—20-30 mins. at 141 degrees C.

Apparently this formula has been devised by I.C.I. Rubber Research Department.

The experiments show that this woodflour, 200 mesh, which is very white, is suitable for use in rubber flooring, and it is sufficiently fine to obviate the need for dyeing before use. The woodflour does not cause darkening during vulcanization at 141 degrees C., and even higher temperatures might be successfully used with safety.]

Extruded Plastics

Auburn, N.Y.

The Editor, *Plastics*.

Dear Sir,—We are particularly interested in the article appearing on page 333 of your October issue, "Extruded Plastics for the Building Trade."

England has certainly taken the lead in this new plastic development. So far as we know, extrusion of thermo-setting plastics is not done in this country, and we were just about to start work on an experimental extruder when the article referred to came to our attention. We are wondering if you would be kind enough to give your prompt attention to this letter in giving us the information requested, or referring our request for information to the proper firms.

First of all, we would like to know the patent situation—whether the process itself is patented or the machines on which the extruded plastics are moulded. We would like to receive copies of whatever patents have been filed relating to this process, and we would like to know whether any British firms have taken out patents in this country. If so, we would be quite willing to consider operating on a royalty basis.

We are interested to know whether the machines used in extruding phenol-formaldehyde-type resins were developed by the firms who manufacture extruded shapes, or whether the machines are obtainable from a machine manufacturer. In the latter case, we would appreciate your referring us to such a manufacturer. We were unable to find in your directory the addresses of: The Dap Manufacturing Co., Rockite Resin, F. A. Hughes and Co. We have in mind the development of extruded plastics for other purposes than curtain runways, and we would be pleased to work on a reciprocal exchange of ideas basis with any reputable British firm.

We are one of the oldest and largest manufacturers of plastics and mouldings in this country, and feel confident that a satisfactory connection with a British firm already engaged in this business would prove mutually advantageous, and your referring us to whatever firm or firms might be interested in selling us equipment will be greatly appreciated.

AUBURN BUTTON WORKS, INC.

[EDITOR'S NOTE.—We have much pleasure in passing this letter to the concerns interested and hope that mutual trade will result. The address of the Dap Manufacturing Co. is 51, The Mall, Ealing, London, W.5, and that of F. A. Hughes and Co., Ltd., is Abbey House, Baker Street, London, N.W.1. Rockite is the name of the synthetic resin manufactured by F. A. Hughes and Co.]

Plastics and Agriculture

London, S.W.7.

The Editor, *Plastics*.

Dear Sir,—By chance at the railway station I bought the November copy of *Plastics*, which I read with the greatest possible interest. I, as most people, have only a very faint knowledge of what is understood by plastics, and I beg you to accept my congratulations on this most interesting and useful issue.

I am publishing, in the course of the next few weeks, a large book on agricultural economics. One of my chapters deals with the future of agriculture. In this chapter I am studying, among other things, the possible future uses of agricultural products as raw material for industries. I would be grateful if you could furnish me with some information as to the agricultural raw material used for plastics. Perhaps you have already published an article on the subject. If so, please send me this copy; if not, could you indicate to me that person in London from whom I could obtain it?

PAUL DE HEVESY,
Hungarian Minister on Vacation.

[EDITOR'S NOTE.—There is no collected information in English on this subject that we know. This is chiefly because there are divisions in the plastics industry which rarely overlap, so that information is rarely disseminated. The following general information may be useful:—

Celluloid acetate, artificial silk and some artificial wools utilize cellulose in some form, such as cotton, wood pulp, etc., for the production of the plastic itself by interaction with nitric acid or acetic acid.

Synthetic resins of the phenol-formaldehyde or of the amino type utilize paper, woodflour, cotton flock and other fibres as fillers. About 50 per cent. is used.

Casein plastics are made from the casein extracted from milk. Casein is also used for the production of artificial wool.

Sisal, jute, hemp and flax have been examined for their suitability as fillers for synthetic-resin moulding powder, while much research has been carried out on the suitability of straw cellulose as the basis for the manufacture of explosives and other cellulose derivatives.

On the whole, we presume Hungary would be most interested in woodflour. The usual qualities are obtained from the soft woods, such as pine, spruce, fir, etc., but certain hardwoods have also been used. The excellent October, 1938, Catalogue issue of *Modern Plastics*, the American journal, contains an article entitled "Filler Requirements," which gives a good summary of the qualities desired. There is also an excellent summary of the utility of fibres in articles by Dr. Yarsley now running in *Sisal Review*.]

Radio Components

Meerut, United Provinces,
India.

The Editor, *Plastics*.

Dear Sir,—As I am not in commerce and not connected in any way with the plastic trade, I should be grateful if you would forward my requests to the most suitable quarters.

Specifications and quotations for small quantities for export:—

1. Tropic-proof glues and insulating varnishes for radio components.
2. Moulded plastics for radio components, such as coil formers, H.F. chokes and knobs.
3. Plastic sheets and panels. Possibilities of assembling a cabinet with plastic sides and metal edges.

These are in connection with experiments I am making with a "Peoples Receiver," the mechanical parts to be made locally, as far as possible, and the rest to be standard English components, manufacturers' surplus, tropic-proofed here. P.F.

[EDITOR'S NOTE.—Will readers who are interested please communicate with us?]

Beauty Containers

St. Helens, Lancs.

The Editor, *Plastics*.

Dear Sir,—We note with pleasure that in your November issue, on page 357, you have an illustration of the built-up beauty container moulded by Colts Patent Fire Arms Manufacturing Co., of America. We thought you might be interested to know that we hold large stocks of these containers, and have the sole selling rights for them in this country.

ASHDOWNS, LTD.

Trade Inquiry

Unit Security House,
Fox and Sauer Streets,
Johannesburg.

The Editor, *Plastics*.

Dear Sir,—I was very much interested in reading the October issue and I shall be obliged if you will ask the British Xylonite Co., Ltd., to send full particulars and prices of the manicure sets illustrated on page 327, and one sample. Perhaps you would be good enough also to invite the T.M.C.-Harwell (Sales), Ltd., to forward particulars of the Temco synchronous electric clock made of Catalin, together with prices c.i.f. Cape Town, and agency terms. RAYMOND BYRNE.

News About Injection Moulding Machines

Moulding Screw Caps in Small Quantities

THE production of plastic moulded parts in small quantities presents many problems. In large-lot production multi-cavity moulds are used, but the high cost of these makes them prohibitive for batches of 1,000 to 5,000, in which so many moulded parts are made to-day.

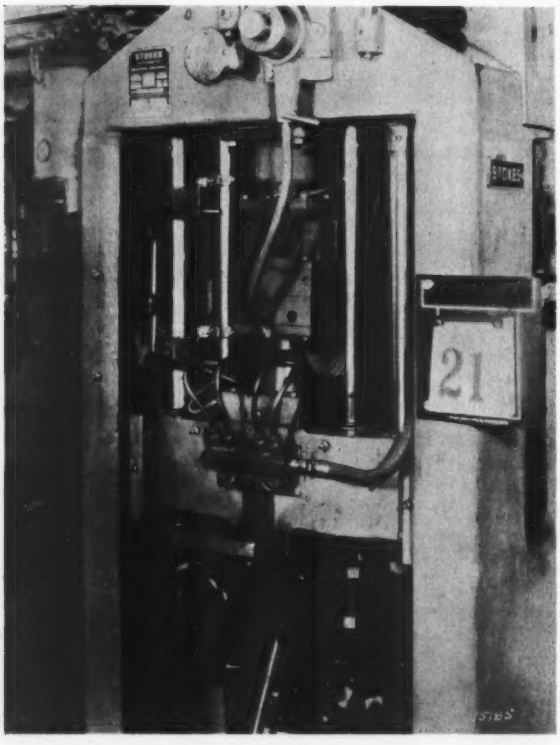
The name of the F. J. Stokes Machine Co. has long been associated with the successful production of plastic moulded pieces in limited numbers, and improvements are continually being made to obtain even greater economy and efficiency.

The latest equipment to become available on these machines is a patented unscrewing arrangement for the production of moulded screw caps used on such a variety of bottled manufactures to-day.

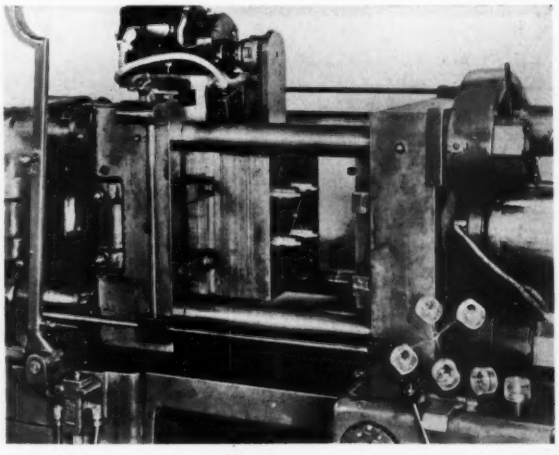
The device consists essentially of a small motor mounted in the head of the machine and which unscrews the mould at the time of ejection so that the caps can be released. The motor is controlled by switches mounted on the guide rod of the platens. The device can be attached to standard Stokes presses already in service or it can be fitted before shipment.

Threads can be moulded either on the inside or the outside of the moulded piece. Briefly, the principle is that one member of the mould rotates whilst the piece is being ejected. When moulding threads on the inside, the die cavity rotates whilst the punch is stationary. Accordingly, the helix must be cut on the punch and ridges provided in the cavity to hold the piece from turning in relation to it.

If, on the other hand, the thread is on the outside, then the helix must be cut in the die cavity and ribs, ridges or recesses cut on the punch to hold the piece from turning in relation to it.



Close-up of the Stokes machine showing the top half of the tool. The sole agent for the machine in this country is Alfred Herbert, Ltd., Coventry.



The unscrewing device on the Reed Prentice machine which makes this well-known machine even more adaptable. This is also handled by Alfred Herbert, Ltd.

In either case, the helix groove, whether on the punch or on the cavity, must clear itself when unscrewing.

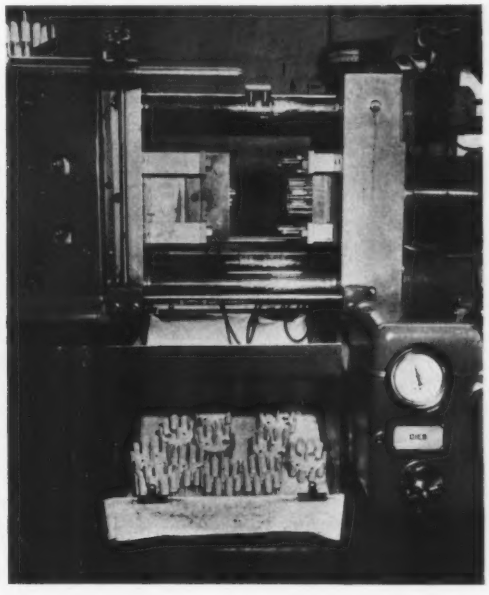
With this device it is possible to mould undercuts or recesses in the top of the cap to hold a gasket. This recess is limited in depth, depending upon the type of moulding compound used. Some compounds are slow setting and, therefore, softer when ejected from the mould. They therefore spring more and show less damage from stripping than other materials which set very quickly. An undercut of ample depth is possible, however, in all cases. The cycle of operations on this part takes about 45 secs. to 60 secs., so that a production of about 1,400 caps per day is possible. Only a single-cavity mould can be used for this unscrewing fitment. A similar arrangement to the Stokes unscrewing device can be fitted to the Reed Prentice machines; this is shown in the illustration.

We should imagine that this contrivance would be very welcome to moulders who are catering for the toilet goods trade and are anxious to extend their connection, particularly with the smaller concerns, who are hardly likely to give large orders for new lines. Whilst long runs of injection mouldings are, of course, very welcome by moulders, there is still quite a fair profit in catering for more modest requirements.

Injection Moulding with Reed Prentice Machines

At British Xylonite Works

WE were privileged a few months ago to visit the Hale End Works of the British Xylonite Co., Ltd., and to inspect their injection moulding shops, where the latest type of Reed Prentice machines are in operation. The articles being manufactured on the machines illustrated are scoops used for filling powder compacts from the main box of powder and are marketed by Weintraud (Rowenta), Ltd. The output of this type of article is, roughly, 1,000 per hour. It is interesting to note that this article was originally contemplated in phenolic resin, but it was soon realized that injection moulding practice using Bexoid powder offered great advantages. The 10-impression mould is designed and made in the British Xylonite Co., Ltd., engineering shop, and since the mould has been in production no trouble of any kind has been experienced.



Reducing Waste in Electro-plating Works with New Bakelite Hooks

A REMARKABLE saving in nickel and similar metals employed in the electro-plating industry can, it has been proved, be effected by the simple expedient of covering the supporting rods with sheaths of Bakelite laminated material. The basic principles of the electro-deposition process are generally familiar. The articles to be plated are made part of the electrical circuit by suspension in the plating solution on metal hooks or supporting rods. Unfortunately, by this means the plating process is not confined to the articles on which a deposit is required. A very heavy coating will, in the course of time, be deposited on the rods themselves, so resulting in a considerable waste of valuable plating metal.

Recent experience has shown that sheathing the hooks with laminated material manufactured by Bakelite, Ltd., largely prevents waste of this nature, due, of course, to the material's electrical insulating properties. The accompanying illustration indicates the advantages conferred by the sheath. Both plating hooks have seen lengthy service and the unprotected metal is plated in certain sections to a thickness of nearly $\frac{1}{8}$ in., while, as will be noted, the sheathed hook is relatively unaffected. The cost of covering the hooks in this manner is very low, while the ultimate saving in plating metal is considerable.

Showing a normal type of plating hook heavily coated with plating metal and a similar hook sheathed with Bakelite laminated material which is seen to remain almost unaffected.

TRADE AND PERSONAL NOTES

Barimar, Ltd., 14-18, Lamb's Conduit Street, Theobald's Road, London, W.C.1, have forwarded us a copy of their new booklet dealing with welding repairs to industrial machinery.

Catalin, Ltd., have changed their address from 3, Vere Street, London, W.1, to Farm Hill Road, Waltham Abbey, Essex.

"The Goodyear Gazette," second edition, has just been published and contains many items of interest to the rubber trade.

Mr. R. C. Clarke, Imperial Chemical Industries, gave an interesting lecture on synthetic rubber to Esher Rotarians at their weekly luncheon at Moore Palace Hotel, Esher, on November 1, 1938.

Reimann School and Studios held their second annual exhibition of students' work on November 15-30. The exhibition covered all the various fields of activity, such as display, commercial art, fashion and photography.

Mr. D. Warnford-Davis, Mr. R. D. Warnford-Davis and Mr. L. T. Gmach have resigned from the board of Crystalate, manufacturers of plastic mouldings, etc., Golden Green, near Tonbridge. Sir Herbert Morgan and Mr. Sydney Rutter have been co-opted to the board, the former also being appointed chairman.

Shawinigan Resins Corporation, Springfield, United States, jointly owned by Shawinigan Chemicals, Ltd., and the Fiberoid Corporation, is now planning additions to its plant and equipment which will double production and permit additions to the number of lines manufactured. The extensions have been urged by the prospective demand for the corporation's vinyl acetal resins, the group of plastics developed for the manufacture of stronger safety glass and allied products. The basic patents are the possession of Shawinigan Chemicals, Ltd. Under the enlarged plant, the Shawinigan Resins Corporation will be able to produce from 10,000 lb. to 12,000 lb. per day, or sufficient resin to manufacture about 50,000,000 sq. ft. of safety glass plastic per year. In addition to the output of resins for safety glass plastics, Shawinigan Resins intends to undertake production of an insulating vinyl acetal resin for sale to the general insulating trade.

Celluloid Printers, Ltd., Surbiton, Surrey, have just issued a new booklet entitled "North, South, East, West, Every Trade Needs Celluloid." The publication comprises a price list of advertising and gift articles made in celluloid, ivorine, glass, wood, ebonite and other materials. Readers can obtain a copy by writing to the firm.

W. T. Henley's Telegraph Works, Co., Ltd., Holborn Viaduct, E.C.1, have just published a fourth edition of their catalogue. This interesting publication contains many items of interest to works engineers. Attention is particularly drawn to the moulded lifting bars fitted to the fuses to enable them to be inserted or withdrawn by a combined screwdriver and lifting handle.

Institute of Plastics Industry, Midlands Section, held a meeting at the James Watt Memorial Institute, Great Charles Street, Birmingham, on November 8, at which Major T. Knowles gave an interesting lecture on "Industrial Tendencies and the Export Trade."

Annual Report on the Progress of Rubber Technology has just been published by the Institution of the Rubber Industry, 12, Whitehall, London, S.W.1, and it gives an interesting survey of the scientific and technical discoveries and developments in manufacturing processes to be recorded in rubber technology during the year 1937.

Mollart Engineering Co., Ltd., Kingston By-pass, Surbiton, Surrey, inform us that they are moulders of all approved Air Ministry plastic materials used in the aircraft industry for such components as:—Gun turrets, wing tips, fairings, cockpit covers, superstructures, wheel spats, navigation lights, panels (machine formed and cut) and flexible windows.

The United Insulator Co., Ltd., is again to be congratulated on the wide range and extraordinary interest of its Second Annual Exhibition, held at the Great Central Hotel, November 14, 1938. Of particular interest to the plastics industry was the Peton display, which was made up of various laminated boards, also a number of bolts, nuts, gearwheels, machined parts and the like made of the same material. Many of these, it was learned, are now finding important applications in the textile industries.

Examples of Peton shown at the Second Annual Exhibition.

British Xylonite Co., Ltd., has formed two subsidiary companies to separate and take over the two main branches of the company's business. The British Xylonite will sell its assets to the two new companies for shares, the capital structure of the parent company being unchanged, and a consolidated balance sheet and statement of profits will be issued. A petition to the court was heard on November 14 to confirm alterations to the memorandum of association of the British Xylonite Co., Ltd.

Manesty Machines for the Plastic Industry.—The latest catalogue just issued by Manesty Machines, Ltd., Liverpool, contains a great deal of information relating to machines used in the modern moulding works. This well-known engineering firm produce preforming presses which produce pellets of accurate weight ready for charging into moulds. The Manesty drug mills and oscillating granulators are also used for breaking down rejected pellets and moulding flash. An interesting use for the oscillating granulator is the increasing of the bulk density of light moulding powders. These are compressed into rough pellets, which are broken up into granular form on the oscillating granulator. A copy of the catalogue will be sent on receipt of a postcard by the makers of Manesty Machines, Ltd., Speke Hall Road, Liverpool.

The Secretary of the Department of Scientific and Industrial Research sends us the following announcement: "The Lord President of the Council has appointed Dr. G. Stafford Whitby, at present director of the Division of Chemistry, National Research Council, Canada, and formerly professor of chemistry at the McGill University, Montreal, to be director of the Chemical Research Laboratory, Teddington, in succession to Sir Gilbert Morgan, F.R.S., who retired on September 30 last. Dr. Whitby is expected to take up his duties early in 1939."

Mr. H. Warren, vice-president of the Institute of Plastics and the Coventry Engineering Society, has been appointed to the board of the British Thomson-Houston Co., Ltd.

Mr. R. H. Moon, formerly with British Celanese, Ltd., and a director of Plastilume Products, Ltd., has now joined the Splintex Glass, Ltd.

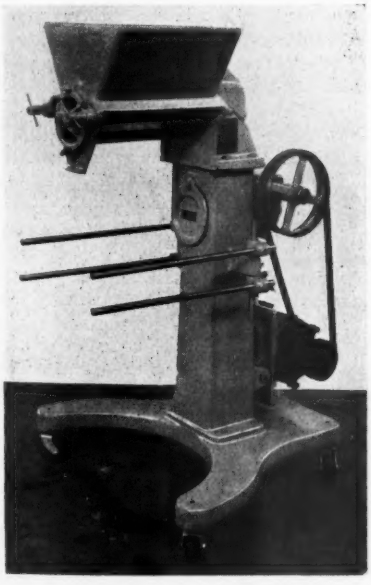
Mosers, Ltd., have just forwarded us their new catalogue and price list of electrical accessories which runs to 63 pages and covers an extremely wide range of materials, many of which find various important applications in the plastics and allied industries.

NEW MATERIALS—NEW PLANT—NEW METHODS

The Stokes Oscillating Granulator

In the plastics industry the new Stokes 43-A oscillating granulator is being found a very serviceable machine. It is of special use in the production of "densified" moulding powders, particularly urea moulding powders. It is used for making granulations from compressed slugs. It has the particular feature that uniform granules are produced for mould filling, with the minimum of fine powder. The materials are forced through wire screens by the oscillating motion of a set of rolls. For industrial granulations generally, where the production of fine powder is a disadvantage, the granulator gives highly satisfactory results.

The granulator is rugged and powerful, whilst its action is quiet and smooth, due to large bearings and machine-cut gears, some of which are oil-immersed. The machine is easy to clean and has a large capacity. An outboard rotor bearing assures proper lubrication without contamination of



the product. Lubrication is by pressure gun, and standard construction is of cast iron and steel.

For the handling of corrosive and sensitive materials, machines and parts in contact with the material are available in bronze, monel metal and stainless steel. The belt-driven model has fast and loose pulleys and a convenient belt-shifter.

The granulator is also available with a compact motor drive, operated through a V-belt, the 1 h.p. motor being mounted on a hinged bracket (see illustration). The machine is then self-contained, and can be made portable by provision of castors. Being movable about the floor to whatever point it is needed for use with other related equipment, one machine in this way can do the work of several stationary machines. Special dust-tight discharge hoppers can be provided.

These machines are on demonstration in the test laboratory of The Apex Construction, Ltd., 133, Oxford Street, W.1, who will be pleased to give further particulars.

Cast-iron Moulds.

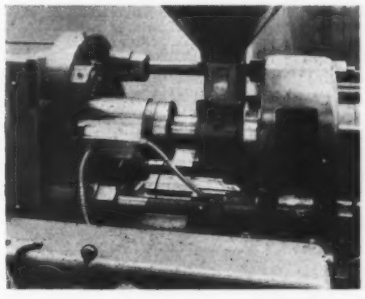
In the *Foundry Trades Journal*, November 10, 1938, reference is made to the experience of the Garfield Manufacturing Company of Garfield, New Jersey, with cast-iron die-blocks used in moulding practice. The basic manufacturing process is the same for all parts, regardless of ultimate service, according to the report. The ingredients, with asbestos as the base, are mixed and kneaded until powder of proper consistency for moulding is prepared. The powder is placed in moulds and pressed into form by hydraulic presses of capacities rated from 5 tons to 500 tons. The formed article is then cured for a period determined by the properties required for its ultimate service. The cold moulding method employed, while it permits a high rate of production, imposes strict requirements on materials from which various parts of moulding equipment are made. They must be tough and hard, capable of standing high pressures and of maintaining microscopic tolerances over long periods of continuous service. Dies to meet these requirements were made from a high grade tool steel and the blocks from a nickel-chromium-molybdenum cast iron. The following is the analysis range of the die blocks, cast from high duty cast iron:—TC, 3.00 to 3.10; CC, 0.60 to 0.70; Si, 2.20 to 2.40; MN, 0.80 to 0.90; P (max.), 0.10; S (max.), 0.08; Ni, 0.70 to 0.08; Cr, 0.20 to 0.30; and Mo, 0.50 to 0.60 per cent.

The iron, it is stated, develops very good physical properties in the as-cast condition, the tensile strength varying between 22 tons and 30 tons per sq. in. Transverse tests made on standard A.S.T.M. 1.2-in. diameter test bars broken on 18-in. centres show transverse strengths varying from 2,600 lb. to 3,600 lb. The hardness range is from 240 B.H.N. to 260 B.H.N.

The blocks have qualities in addition to their physical properties that add considerably to their serviceability in this particular case. They are quite large and massive, being from 4 ins. to 7 ins. thick and 18 ins. to 2 ft. square.

Induction-heating Cylinder on Reed-Prentice Machine

This is said to represent the greatest advancement since the development of injection moulding. The capacity of the machine is 6 oz. moulded and the estimated shots per hour total 300, varying with type of product. Pressure per sq. in. of material 2,000 lb. to 20,000 lb., regulated through pressure valve. The



Close-up of the new induction heating cylinder on the Reed-Prentice machine.

inclusion of the induction-heating cylinder permits:—

1. Absolute uniform heating of material.
2. More accurate temperature control of material.
3. Quicker heating and better maintenance of temperature.
4. Longer life of heating cylinder.

Effect of Heat and Moisture on Plastic Materials

According to a recent article in *The Electrician*, November 11, 1938, the resistance to deformation under heat is generally in the following order:—

(a) Urea-formaldehyde resin, unfilled.

(b) Urea-formaldehyde resin, paper filled.

(c) Phenol-formaldehyde resin, fabric filled (so-called shock-resisting grades).

(d) Phenol - formaldehyde resin, wood flour filled.

(e) Phenol-formaldehyde resin, asbestos filled.

The first named exhibits the largest amount of deformation and the last named the least.

PATENTS RELATING TO PLASTICS

These abridgments of recently published specifications are specially compiled for this journal by permission of the Controller of His Majesty's Stationery Office. Group abridgments can be obtained from the Patent Office, 25, Southampton Buildings, London, W.C.2, either sheet by sheet, as issued, on payment of 5s. per group volume, or in bound volumes, price 2s. each, and the full specifications can be obtained from the same address, price 1s. each.

491,244. Synthetic Resin Articles

HAARHOFF, D. VAN DER M. January 25, 1937.

A centrifugal pump for liquids or pulp containing sand, gravel, etc., has some or all of its interior parts formed, coated, or filled wholly or in part by a substance comprising hard granular wear-resistant material held together by a bonding material. The wear-resistant materials include emery, bort, corundum, quartzite sand, or other abrasives, and the bonding materials include synthetic resins or rubbers, or organic plastics. In the case of a coating the mixture may be painted or sprayed on, or the bonding material sprayed in a molten condition, the abrasive then sprinkled on, and the whole heated to consolidate the coating, while the surfaces to be coated may be prepared by roughening, painting, spraying, or electroplating. The impeller is formed by moulding under pressure a composition such as a mixture of corundum and synthetic resin.

488,937. Proofing Permeable Materials

MOORE, J. G., MOORES, E., and IMPERIAL CHEMICAL INDUSTRIES, LTD. January 15, 1937.

Paper films of regenerated cellulose and like materials are waterproofed by a composition of chlorinated rubber, a plasticizer, a wax, e.g., paraffin wax, and a condensation product of a polybasic acid, e.g., phthalic acid, with a mixture of glycerol and one or more drying oils, e.g., linseed and/or tung oil. The chlorinated rubber preferably contains about 65 per cent. of chlorine; plasticizers specified are dibutylphthalate and tricresylphosphate; the resin may be one known under the registered trade mark "Paralac." The composition may be dissolved in a volatile hydrocarbon solvent, e.g., benzine, toluene, or xylene, with or without an ester, e.g., butylacetate, and may be applied or by passing a continuous web of the material through a bath of the solution. In an example, chlorinated rubber (65 per cent. chlorine), paraffin wax, etc., are dissolved in toluene.

489,954. Chlorinated Rubber

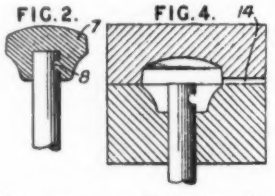
RAOLIN CORPORATION. February 5, 1937.

A solution of rubber in carbon tetrachloride or other halogenated solvent is boiled until its viscosity is permanently lowered, and chlorine is passed in while maintaining the solution at boiling point under reflux. The rubber may be milled to plasticity before boiling. The time of boiling is generally not less than six hours; longer than 48 hours is not necessary. In the first stages of the boiling, solvent may be permitted to escape to remove any moisture. Chlorination may be facilitated by the use of catalysts and ultra-violet rays. When chlorination is complete, boiling is continued for a time to remove hydrochloric acid and free chlorine. Lime or the like is now added to neutralize any remaining traces of acid, and the clear solution is decanted from precipitated impurities and the rubber recovered.

485,448. Moulding Knitting-pins.

ENGLISH NEEDLE AND FISHING TACKLE CO., LTD., and RICHARDSON, T. H. September 20, 1937.

A knitting-pin or a hooked pin employed in tricot work has a knob or head 7 of cellulose acetate moulded around the end and keyed thereto by the material of said knob engaging a



shoulder, recess or hole 8 in the end of the pin. The material may be injected through a gate 14, Fig. 4, of a mould into which the pin head projects.

490,432. Plasters, etc.

CHEMISCHE FORSCHUNGSGES. February 13, 1937.

Plasters or bandages are made by impregnating the base material with a polyvinyl compound, such as polyvinyl alcohol, or by applying it as an adhesive.

479,508. Adhesives

CELLULOID CORPORATION. May 2, 1936.

Sheets of cellulose nitrate are united to foils of cellulose acetate by applying to the former a cement comprising, by weight, 50 parts dimethyl phthalate, 25 parts ethylene glycol monoethyl ether acetate and 25 parts ethyl alcohol, the cement being allowed to dry and the sheets and foils united by heat and pressure.

488,938. Porous Chlorinated Rubber

MOORES, E., LOWES, A. P., IMPERIAL CHEMICAL INDUSTRIES, LTD., and BAXTER, J. P. January 15, 1937.

In the process described in the parent Specification for making porous blocks of chlorinated rubber by emulsifying a solution thereof, and removing the solvent, the chlorinated rubber solution is emulsified with a condensation product of naphthalene sulphonic acid and formaldehyde, or an alkali metal salt of such product.

489,331. Moulding Hollow Articles

BRITISH CELANESE, LTD. January 21, 1937.

Hollow articles are made from organic plastic materials such as cellulose derivatives, synthetic resins, etc., by applying the material in solid or powdered form, or as a solution, to a hollow core of glass, china, or earthenware, and subsequently removing the core by breaking it into pieces. Hollow articles formed on the cores may be moulded externally. The hollow articles may have metal inserts that are applied to the core with the plastic.

489,305. Rubber Compositions

STAHL, R. January 25, 1937.

A rubber or other vulcanizable composition for belting, shoe heels, tyres, or the like, comprises abrasive particles having a surface of a metal which adheres positively to rubber when vulcanized, e.g., brass. The particles may be homogeneous, or they may consist of iron, steel or carborundum plated with brass. The particles are preferably concentrated near the surface exposed to wear.

479,927. Bituminous Compositions

STRABA STRASSENBAUBEDARFS-AKT-GES. May 11, 1936.

Waste dust separated by a dust separator, e.g., from illuminating gas or from cement manufacture, is converted into cloud-like form and mixed with a mist of liquefied bituminous material to give a pulverulent product. Tar hardened by aldehydes may be used as the bituminous material.

490,828. Polyvinyl resin compositions

ELOD, E. November 5, 1936.

A composition for a dental filling consists of polyvinyl esters or polystyrenes, particularly the polyvinyl acetate known as Mowilith.

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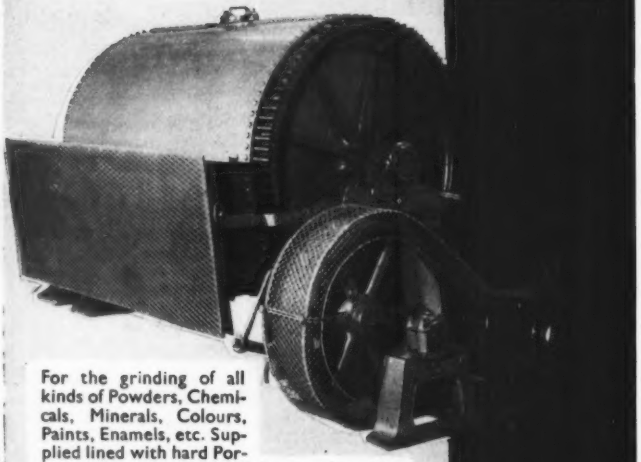

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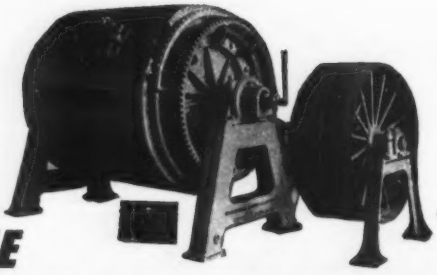

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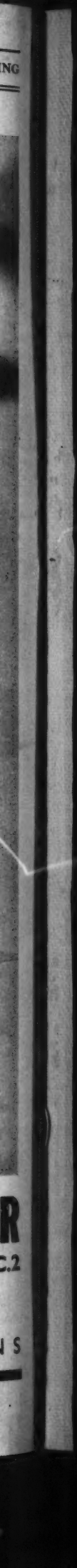
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